HP Professional

THE MAGAZINE FOR HEWLETT-PACKARD ENTERPRISE COMPUTING ▲ VOL. 7 NO. 8

AUGUST 1993

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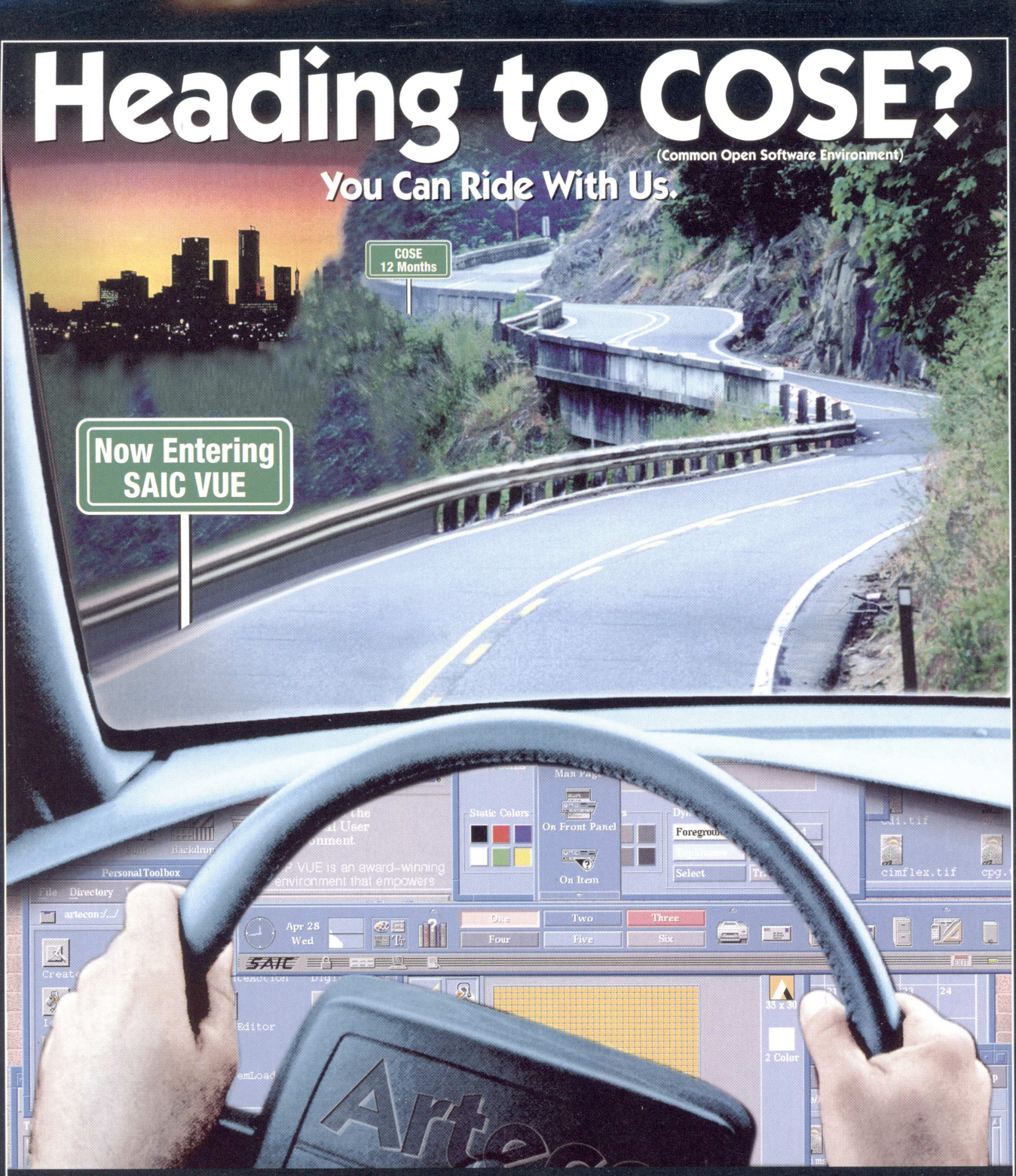

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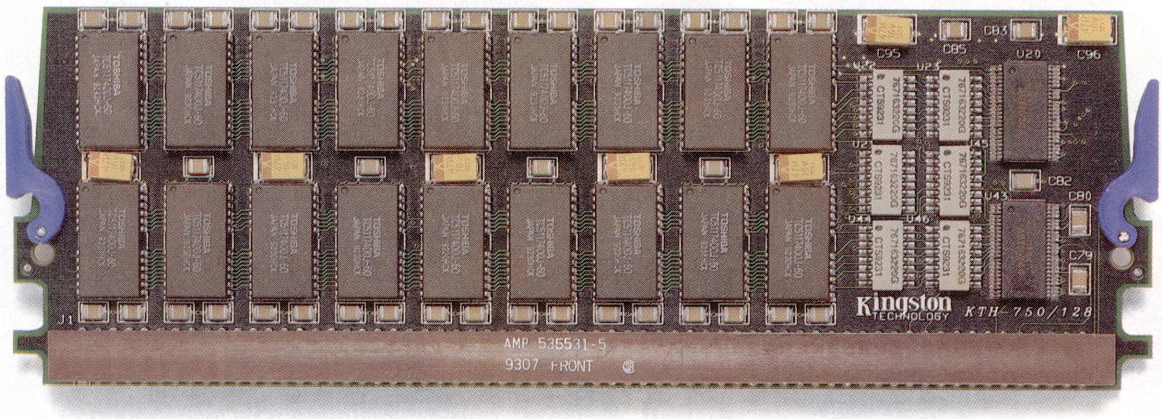

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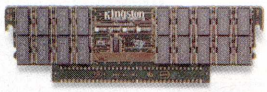

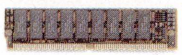

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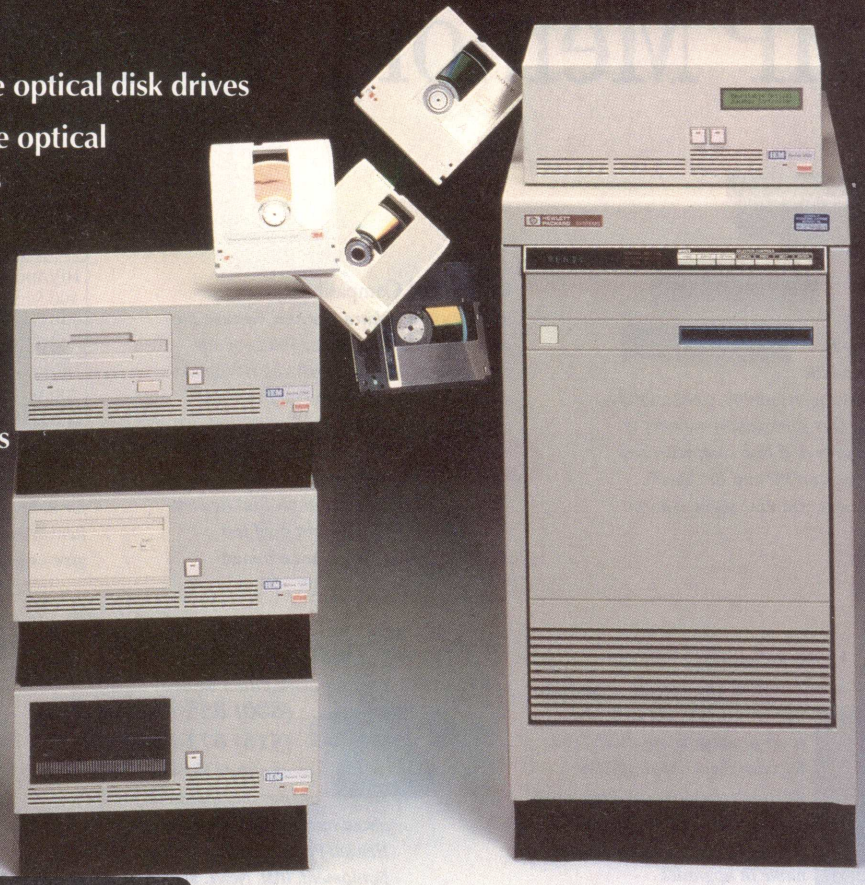

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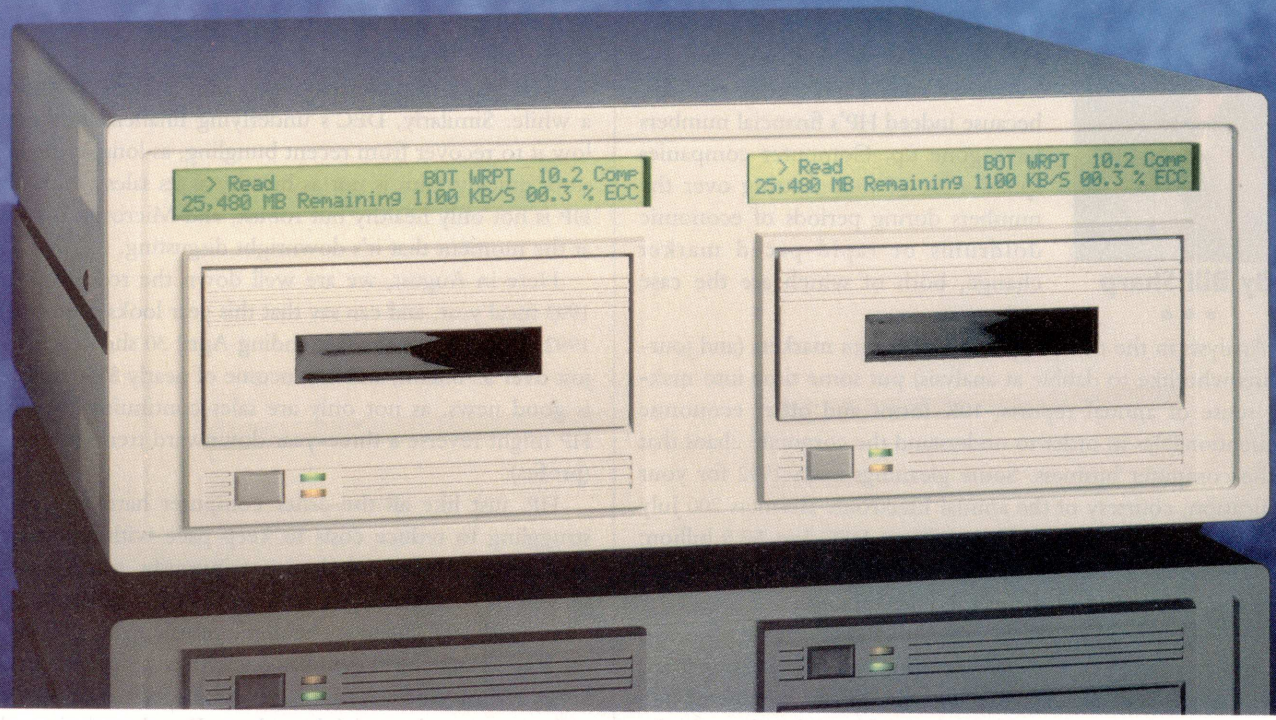

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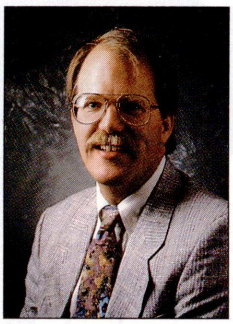

By Bill Sharp

Your number's up! If you were DEC or IBM or Wang last year, the phrase meant something dreary. If you were HP, it meant something altogether different and considerably more pleasant, because indeed HP's financial numbers have gone up. Computer companies spend a lot of time fretting over the numbers during periods of economic doldrums or rapid-paced market change, both of which are the case right now.

Analysts in the computer and electronics markets (and journalists who like to dabble at analysis) put some time into making sense of annual reports, 10K forms and other economic unmentionables in order to understand the corporate chaos that is the computer business. Some gleanings from 1992 for your edification, courtesy of the annual Electronic Business 200 July 93 issue, include, IBM lost $6.9 billion; DEC lost $2.5 billion; Sun earned $128 million; Apple earned $526 million; HP earned $549 million; and Microsoft earned $834 million.

So do you need to get an economics degree or an MBA to have some inkling of what is happening with these companies? Don't waste your money. But if you have an investment in a company, give some thought to the health of that firm. At the very least, take a good look at the annual numbers that show up in Business Week, Fortune, Datamation or Electronic Business. A brief time investment now can help safeguard your capital investments later.

The process of competing in an open market is rather like a political election. Users vote with their dollars for the most desirable product, which in turn determines the course of the market. Fortunately, in computer marketplace elections, you have some useful measures of vendor candidates that are less capricious than those in other political arenas.

For instance, during 1992, profits as a percentage of sales for the companies above ranged from DEC at -17 percent to HP at 4.9 percent to Microsoft at a whopping 25.6 percent. Coupling these numbers with those above helps you to understand more of what is happening with them. Clearly, DEC had an awful year, HP did well and Microsoft is erecting new buildings just to hold the cash.

Another interesting number is long-term debt — the more you have, the more leveraged the company is, and the tougher it is to recover from a business downturn due to the interest burden (not unlike the national debt). Long-term debt in 1992 as a percentage of total capital for these firms shows IBM with 22.6, Sun with 16.6, HP with 4.6, DEC with 0.8, and Apple and Microsoft with none.

You begin to understand why IBM is likely to flounder for a while. Similarly, DEC's underlying financial health may allow it to recover from recent bungling, as long as the bungling stops quickly. Sun is not as healthy as its sales would indicate, HP is not only healthy but robust, and Microsoft is so well off at the moment that it's downright disgusting.

Here in August, we are well down the road through HP's 1993 fiscal year, and can say that this year looks even better than 1992. Data for the quarter ending April 30 showed net sales of just over $5 billion, and net income of nearly $350 million. This is good news, as not only are sales continuing to climb, but HP might reverse a three-year downward trend in net income (profits).

HP, just like all the other computer hardware makers, is struggling to reduce costs to keep pace with dropping hardware prices. Prices can drop precipitously, but it takes much longer for companies to transform their infrastructure and employee skill sets. These are painful internal changes. To its credit, HP started making these changes with a vengeance in the late 1980s and may now be raking in profits while competitors are trying to stop the red ink gushers. But the previous drop in profits is evidence that even in HP there has been some pain.

Another number that gives a good oblique measure of how efficiently a company uses its people is sales, general and administrative expenses (SG&A) as a percentage of sales. Comparing the hardware companies shows DEC at 33.6 and IBM at 30.3, Sun at 27.4, HP at 25.8 and Apple at 23.8. The lower the number here, the more efficient the company, and again HP looks stronger than most.

If net income continues the upward trend it began this year, HP will take full advantage of its streamlining efforts of the past several years, emerging clearly at the head of the financial pack among its direct computer-industry competitors. Yep, HP, your number's up! — *Bill Sharp is* HP Professional's *Technical Editor.*

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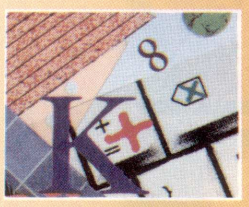

INDUSTRY WATCH

Bill Sharp

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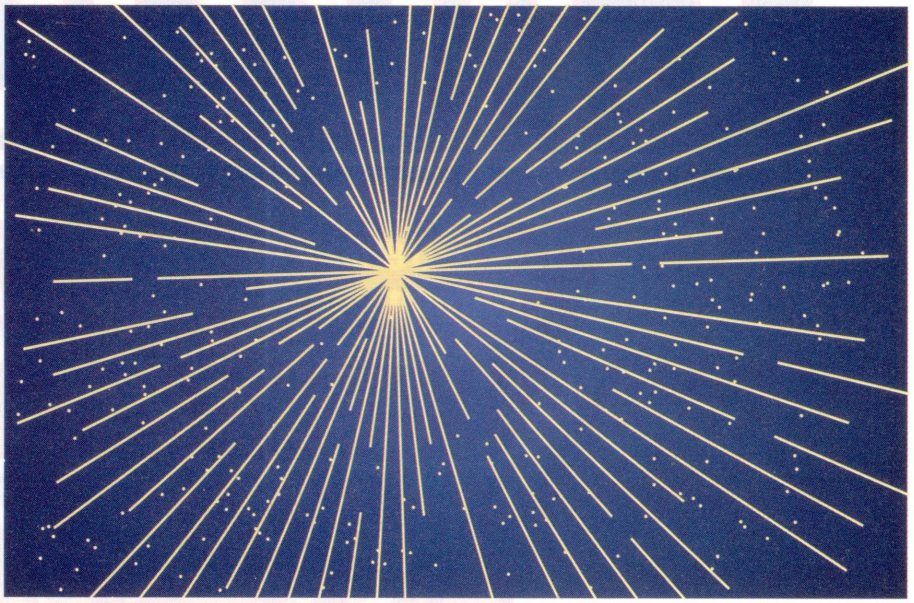


Illustration by Jack Rotoli

You're walking down the aisle at a trade show, ogling the oddities, gawking at glitz — just cruising and minding your own business. Then, in an unguarded moment near the Hewlett-Packard booth, *he* pounces on you with a high-tech parody of the Pepsi challenge. "You got the right one, BA-by," he croons through his grin, guiding you with firm hand into his booth. In but a moment you are seated before two identical screens, running identical software. "Go ahead, try them both," he smiles with a vast array of teeth. "Then you tell me, which is the workstation and which is the X station?" He glides away to give you some time, murmuring, "You got the right one, BA-by". . . .

Maybe this is not quite the way it plays out in real life, but when K.C. Chavda, channels marketing manager for HP's Panacom Division holds real life "taste tests," he finds that almost 70 percent of those asked, identify his X stations as workstations. Chavda's point is not that X-terminals are faster than workstations, but rather that when properly set up in a cluster with workstations, users typically cannot tell the difference. The message: It's OK to buy X-terminals clustered with workstations and save some money over buying all workstations. "You are no longer a second-class citizen when you choose an X station," proclaims Chavda.

X-terminals are a surprisingly successful part of HP's plan to carve up the desktops of the world with attractive HP systems, whether the customer leans to PCs, X-terminals or UNIX workstations. X-terminals omit local storage and high-end computational muscle in a tradeoff for holding down the cost per seat for networked and clustered systems. This is a case where HP entered the market especially early, and got off to a great running start with attractive products.

The fast early moves have paid off. In 1992 HP accounted for fully 25 percent of all X-terminal revenues and 20 percent of all units worldwide, says Chavda, making HP No. 1 in revenues and a close No. 2 in units shipped. What's more, HP's closest competitor, NCD leads in black and white X-terminals the market segment—that is fading as color takes over —and HP dominates color X-terminals.

When HP entered the X station market two years ago, it did so with a well-packaged zippy counterpart to the then new Series 700 workstations. Both families became big favorites overnight. By bringing the two together, HP is working to drop the cost per seat available to users without asking for much compromise in performance, says Chavda.

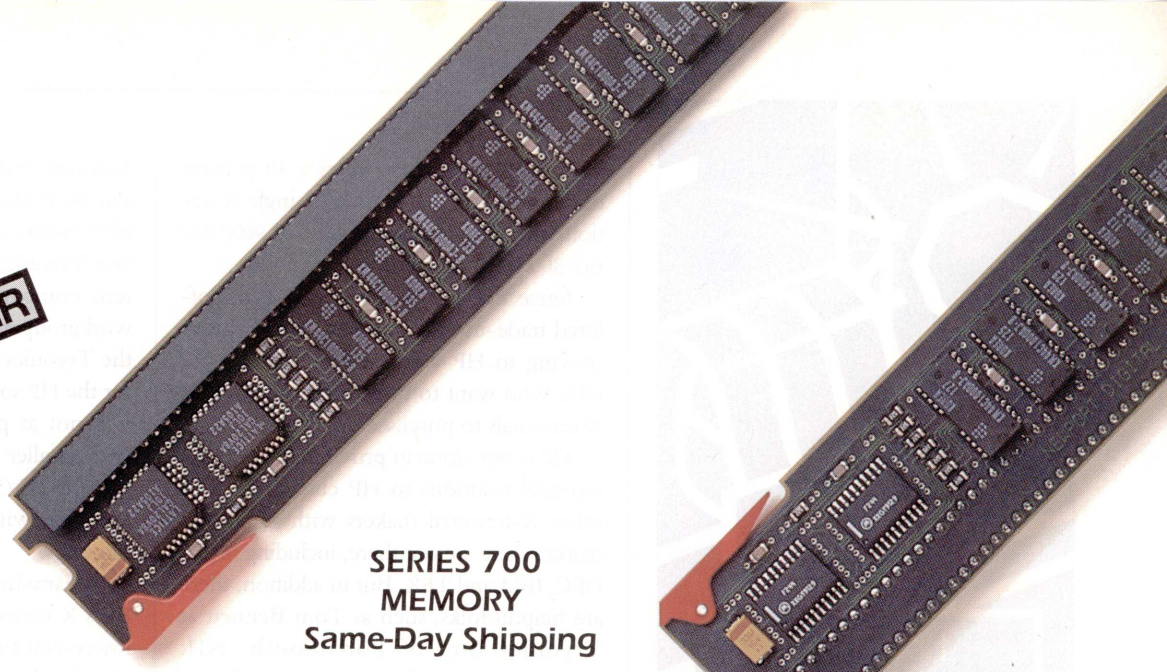
HP's new clusters include:

- 15-inch color workgroup, including:
  - ✓ One 715/33 workstation with 15-inch color monitor, 32 MB RAM, 525 MB disk, CD-ROM drive.
  - ✓ Two HP 15Ci X stations with 15-inch color monitors, 10 MB RAM.
  - ✓ Price: $11,834. Cost per seat: $3,945.
- 17-inch color workgroup, including:
  - ✓ One HP 715/50 workstation with 17-inch color monitor, 32 MB RAM, 1GB disk, CD-ROM drive.
  - ✓ Two HP 17Ci X stations, 17-inch color monitors, 10 MB RAM each.
  - ✓ Price: $17,873. Cost per seat: $5,958.
- 19-inch color workgroup, including:
  - ✓ One HP 715/50 workstation with 19-inch color monitor, 32 MB RAM, 1GB disk, CD-ROM drive.
  - ✓ Two HP 19Cs X stations, 19-inch color monitors 10 MB RAM each.
  - ✓ Price: $21,635. Cost per seat: $7,212.

Purchased separately, some of the X stations are priced as follows:

- 14-inch HP Ci X station is $2,495.
- 15-inch HP Ci X station is $2,995.
- 17-inch HP Ci X station is $3,995.
- 19-inch HP Cs X station is $4,995.

Not to leave out folks who need to experiment with X stations in commercial



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HP-345/375/380			■	■		■	■
HP-360			■	■	■	■	
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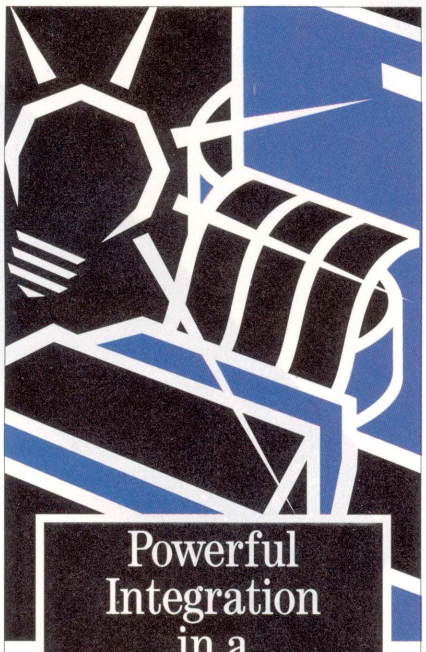
systems, HP currently offers a 40 percent discount off the purchase of a single X station with the purchase of any HP 9000 Series 800 business server.

Since the first of the year, HP has offered trade-in discounts not only for users moving to HP workstations, but also for folks who want to turn in other brands of X terminals to purchase one from HP.

HP is not alone in providing helpful X-terminal solutions to HP customers. The other X-terminal makers with significant market share are out there, including NCD, DEC, IBM and TEK. But in addition, there are helpful folks, such as Tom Bennett at Tryonics Inc. of Portsmouth, NH. Tryonics is better known as a supplier of refurbished HP and Apollo workstations. Recently, however, the firm began marketing its X-terminal clusters, assembled in Portsmouth out of parts from Samsung (an HP partner) and other vendors.

"We buy major subassemblies from Samsung and integrate them here and we can do it cheaper than if we buy a complete system from them," says Bennett. He says Tryonics can supply a three-seat system comparable to HP's 19-inch color workgroup for a cost-per-seat of $6,000 for the Tryonics solution, compared to $7,212 for the HP solution. Bennett says Tryonics will not at present supply clusters made with smaller than 19-inch monitors using the HP 715/50, so they will not in effect compete with HP's lowest cost-per-seat offerings.

Meanwhile, says Chavda, the cost of HP's X stations will continue to drop and lower-cost monitors help vendors, including HP, bring down their prices. While HP's current bottom-end monochrome X station currently costs around $2,000, he says entry-level X station prices "will move under $2,000 yet this year, and under $1,000 by the middle of next year." Hang onto those seats, folks! ■



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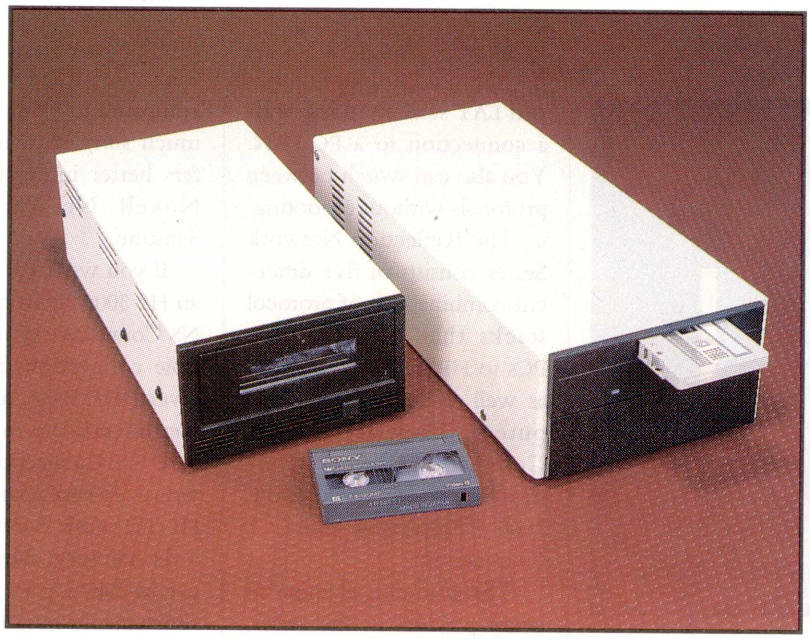

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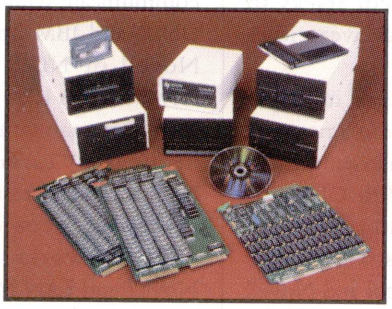

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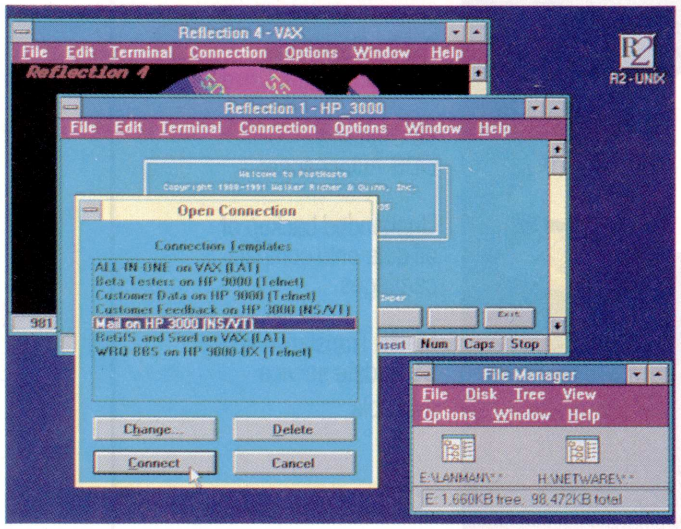

WRQ's Reflection Network Series Provides Simultaneous PC Access To Hosts And LANs

Today's traveler often requires access to different routes, stopping at several destinations to gather information before completing the journey. The Reflection Network Series for DOS and Windows from Walker Richer & Quinn Inc. offers the same approach for the network user who needs to access various data located throughout the network during the course of their journey called the workday.

The Reflection Network Series gives PC users simultaneous access to host computers and LANs, providing connections to HP, VAX/VMS, IBM and UNIX-based hosts, along with Novell or any NDIS-compliant LAN; thereby supporting most popular LANs.

The Series architecture allows simultaneous support of multiple protocols. With a single network interface card in the PC, you can have simultaneous NS/VT, Telnet and LAT sessions along with a connection to a PC LAN. You also can switch between protocols without rebooting.

The Reflection Network Series consists of five different combinations of protocol stacks that connect LAN PCs to HP, Digital and IBM, as well as UNIX host computers. They are the NS Connection, Telnet Connection, TCP Connection, 3000 Connection and LAT Connection.

The common element in every product in the series, except the Telnet Connection, is WRQ's interface converter. This converter allows a network card and its driver to be shared among several protocols. This modular, unloadable protocol approach saves considerable memory for other programs.

With Open Data-Link Interface (ODI) protocol available in Version 2.1, the interface converter allows WRQ's protocol stacks to run unchanged over either NDIS or ODI.

ODI manages multiple protocol stacks on a network adapter card, allowing them to co-exist. With ODI support, Reflection Network Series Products will provide multiple protocol and Novell concurrency with any network adapter that has an ODI driver.

Estee Lauder (Long Island, NY), is a beta test site for the ODI version. Vinny Sansone, system manager, has the software running on the company's network of HP 3000s. "The advantage of this compared to NDIS is that it's much simpler to use. It offers better integration with Novell NetWare," says Sansone.

If you work exclusively in an HP 3000 environment, the NS Connection provides multiple connections to one or several HP 3000s, along with concurrent access to PC LANs. The NS Connection delivers virtual terminal connections to HP Network Services using little memory, ranging from five to 35K. Up to 32 NS/VT simultaneous sessions can run over Ethernet or Token-Ring networks. The NS Connection requires any HP 3000 with NS 3000 software or ThinLan 3000 Network Link software.

If you need access to HP's Network Services, in addition to TCP/IP, LAT and PC LAN servers, the 3000 Connection is for you. It gives a PC with a single network interface card the ability to communicate with HP, VAX, UNIX and IBM hosts, and a Novell or NDIS terminal server such as LAN Manager. You can maintain simultaneous NS/VT, Telnet and LAT terminal sessions with concurrent access to the PC LAN networks such as Novell and LAN Manager.

Products in the series range in price from $99 to $399. *—Lonni Wright, Contributor*

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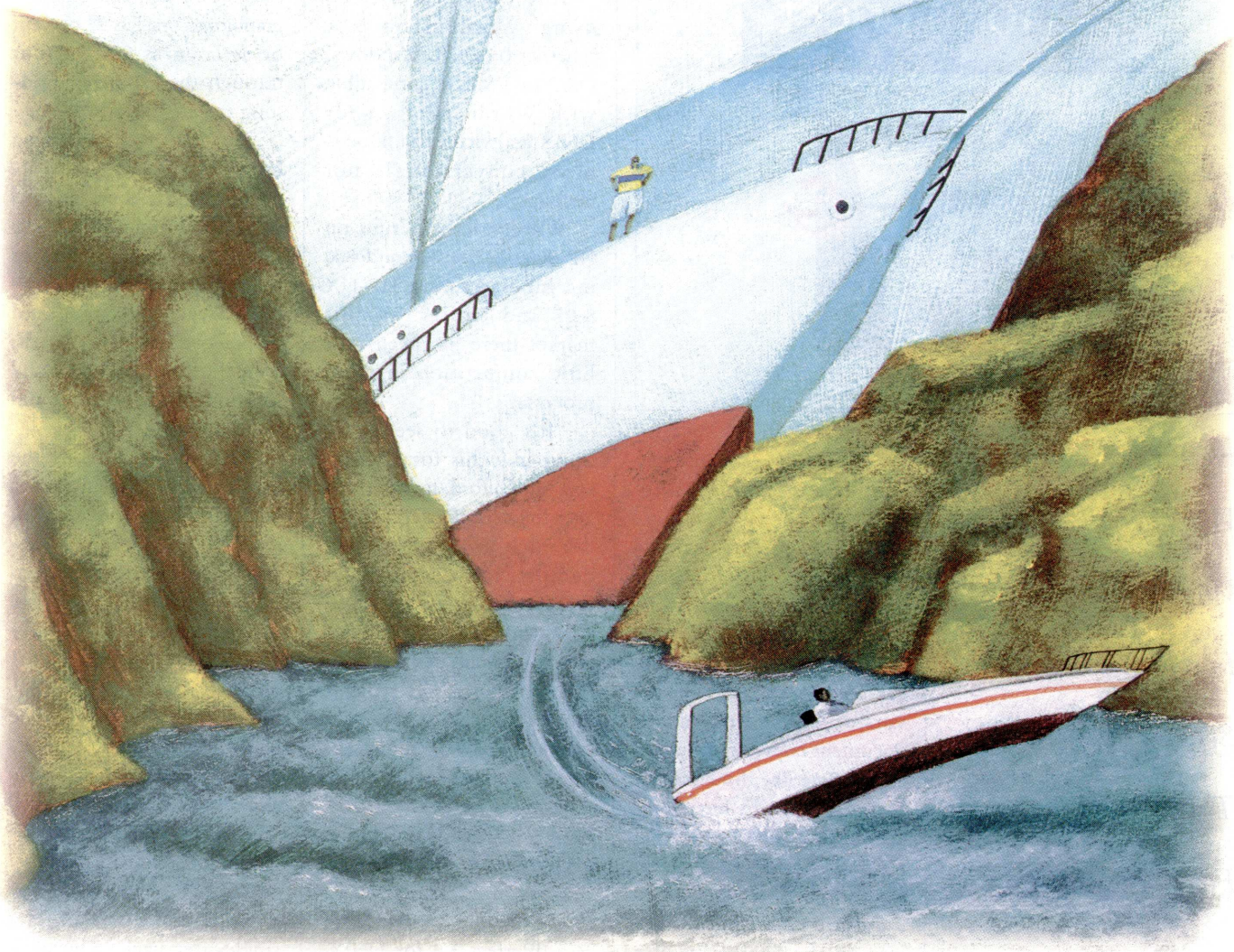

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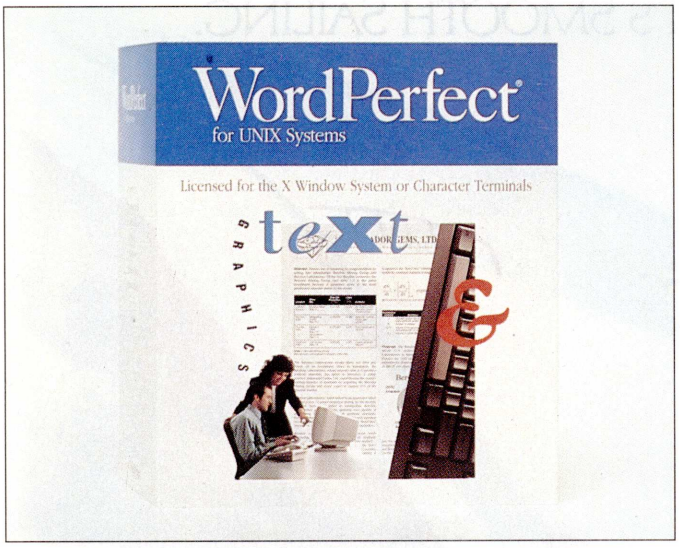
UNIX Perfect



WordPerfect Delivers Word Processing For Your HP 9000 Series 700/800 That Rivals That For Your PC

You don't want just any word processing software for your HP 9000 running HP-UX. You've probably always hoped there would be a high-end word processing software package that includes both a graphical and a character-based version. One that makes document conversion unnecessary. One like those offered to the PC world but never available for the UNIX world — until WordPerfect Corp. introduced WordPerfect 5.1.

WordPerfect 5.1 capitalizes on the familiarity of a character-based word processor and the comfort of a graphical user interface by providing both varieties in one package.

The character-based version has an executable file and runs on X Window systems. The GUI version resembles WordPerfect 5.1 for Windows with a Motif implementation. The two versions have interchangeable features and produce identical document file formats.

Any document created using WordPerfect 5.1, whether on DOS, Windows, OS/2 or VMS, is compatible with WordPerfect 5.1 for UNIX and vice versa. Document conversion is not necessary.

WordPerfect 5.1 runs on HP 9000 Series 700 and 800 machines running HP-UX 8.07 and earlier. In this market there has been very little competition in word processing.

"It's good to see something like this for UNIX," says Jim Gifford, testing manager for WordPerfect UNIX. "We haven't had a lot of competition except from desktop publishing packages. And while the graphical version has certain desktop publishing features, like typesetting features, these are intermingled with the workhorse word processor."

Tables, Equation Editor, Context-Sensitive Help and a Graphics Editor are new features in WordPerfect 5.1 that weren't available in WordPerfect 5.0 for UNIX. Other features, such as List Files (renamed File Manager), Macros and the Merge language, have been enhanced.

Several graphical tools that aid in document creation are included in the GUI version. The Ruler lets you make formatting changes anywhere in your document. The Button Bar lets you access commonly used features easily.

Zoom Edit allows for editing in preview mode. You can display and edit text and graphics as small as 25 percent or as large as 200 percent through the Document Editing screen.

The Font Preview dialog box displays font sizes and attributes before they are used in a document. The new Graphics feature allows graphical images to be rotated, scaled, cropped and flipped over an X- or Y- axis. You also control the size and location of the graphic and the border style.

According to Gifford, the 5.1 for UNIX version has been further enhanced as of April 1993. "One new feature is 'mail enable.' From inside WordPerfect you can mail a document, if you have WordPerfect Office for UNIX or UNIXmail.

"A third-party interface allows you to develop application software and use WordPerfect as a front-end." The latest version also includes speed enhancements.

WordPerfect 5.1 for UNIX is priced at $495 for a single-user pack. The pack includes one license, media and documentation. Additional licenses are available in single, five, 10 and 20 packs. Upgrade pricing is also available. —*Lonni Wright, Contributor*

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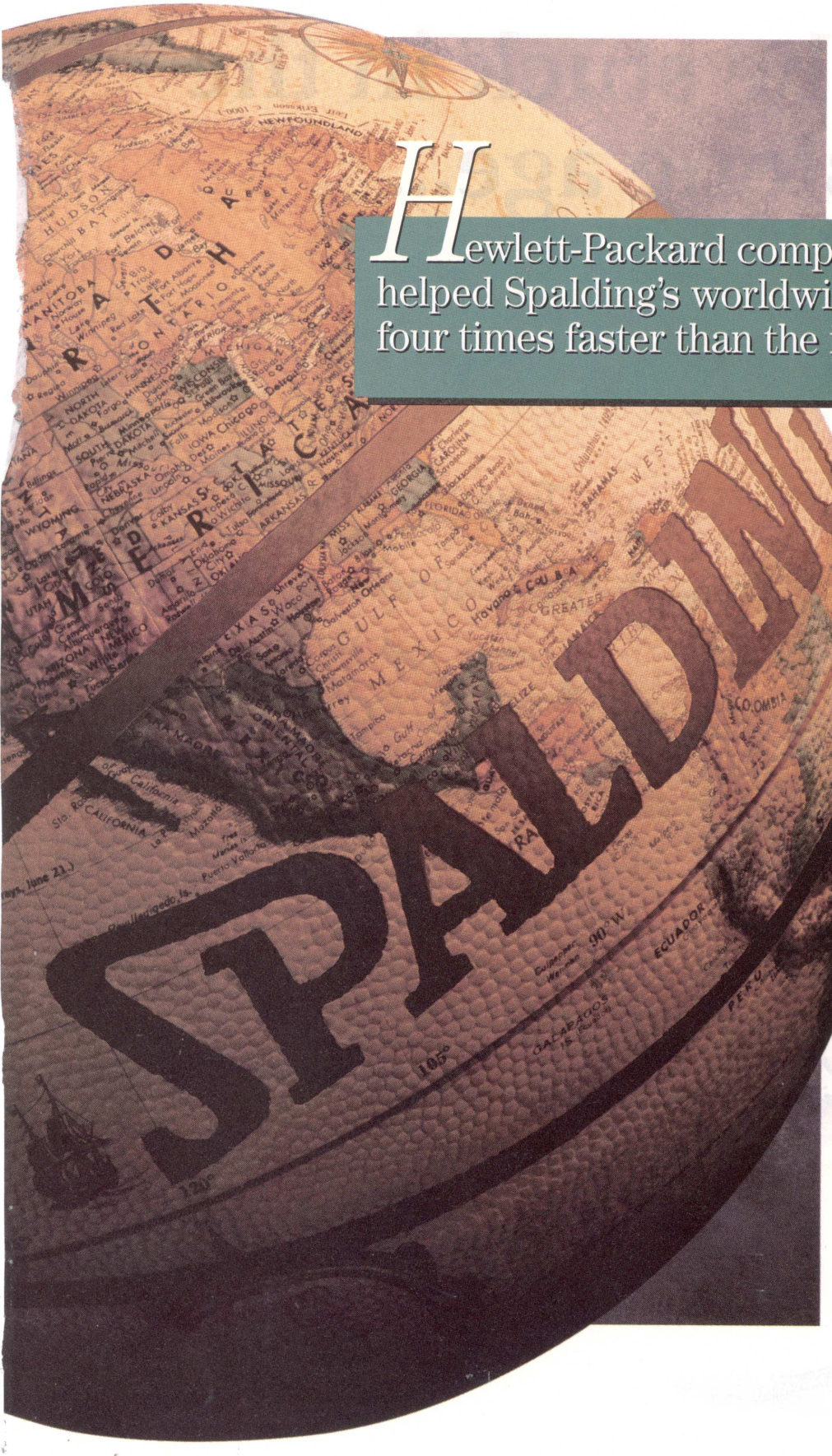

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Bard White, Spalding's CIO and Worldwide Director of MIS

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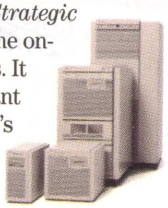

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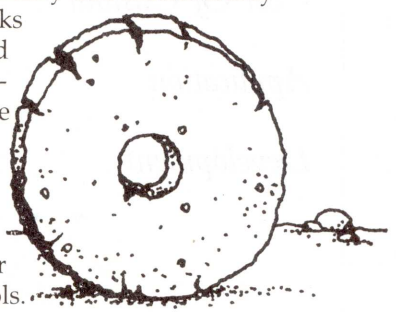

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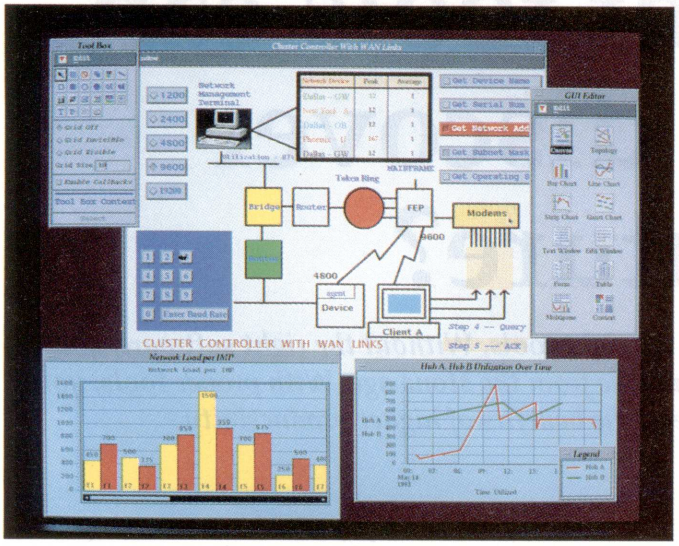

Template Software's SNAP 5.0 Reduces The Time And Cost Of Custom Application Development

In today's increasingly competitive global economy, businesses expect IS departments to produce elaborate, full-function applications that distill volumes of data and supply guiding strategic information.

To address the urgent need for powerful, strategic applications, Template Software Inc. (Herndon, VA) offers SNAP, an application development environment which integrates object technology, knowledge-based systems, client-server communication and GUIs.

SNAP is based on a template architecture which organizes multiple components of prewritten and predefined software — enabling large amounts of code to be recycled in application development. According to Template, SNAP provides more than 80 percent of the code for complex, customized applications.

With the latest release, SNAP 5.0, Template has incorporated new GUI-building tools and extended the capabilities of its unique Shared Information Base (SIB), which enables interprocess communication between applications running on one platform or multiple heterogeneous platforms.

Release 5.0 also boasts an enhanced Communication component, providing object sharing in a peer-to-peer, heterogeneous network. A new set of Remote Procedure Call (RPC) capabilities allow for action-oriented interprocess communication.

So what about those large, active databases already in use? No problem. SNAP allows existing databases (and even flat file systems) to be mapped into a SNAP data structure and accessed efficiently. Interfaces for a host of popular RDBMSs are included, and SQL is supported as well.

Say you've invested some time and money on in-house development and don't want to discard the resulting code. SNAP's External Application Software Manager can integrate any language that can be linked to C code. In addition, SNAP's Application Program Interface (API) is published, so existing systems call and interact with SNAP objects.

Such features attracted Northwest Airlines. Northwest needed to maximize use of its fleet of 360 aircraft while scheduling regular maintenance — a complex process.

Northwest decided to build a system which uses the host-based maintenance and engineering system as an information distribution and reporting hub. According to Northwest's Doug Heuer, the application developed with SNAP was Northwest's first foray into client-server computing with a workstation platform. A COBOL shop, Northwest's team of four developers had little exposure to object-oriented programming.

"We chose SNAP for its inference engine and its GUI," notes Heuer. "We needed a single, specific expert system application, and SNAP provided an excellent graphical vehicle."

Northwest's development team built the maintenance and engineering system in under four months, to run on ten distributed workstations, with a central server.

SNAP 5.0 supports open systems standards and runs on the majority of RISC-based workstations. HP-UX, SunOS, Solaris, AIX, Ultrix, VMS, MS Windows, Windows NT and UNIX are among the operating systems supported. Oracle, Sybase, Interbase, Informix and Flat Files DBMSs are supported, as are TCP/IP and DECnet communication protocols. —*Grant Evans, Contributor*

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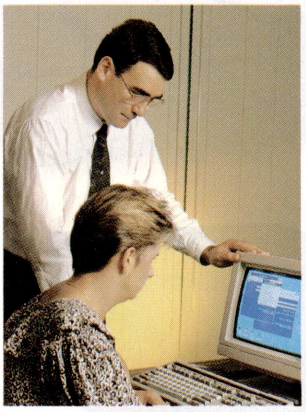
The Languages Of Money

Systems Union Develops Multinational Financial Software For UNIX Systems



"Financial management solutions must be multiplatform, multicurrency and multilingual, with a high degree of flexibility".

Robin Morris
CEO
Systems Union

Multinational corporations must deal daily with differences in language, currency and regulations, and so must their financial software. Since its founding in 1981, Systems Union's goal has been to provide accounting and financial management solutions that can be used worldwide.

"Financial management solutions must be multiplatform, multicurrency and multilingual, with a high degree of flexibility," says Robin Morris, CEO, Systems Union Inc. (White Plains, NY, and Camberley, Surrey, England). "In short, they have to have mainframe functionality on midrange and low-end systems."

Systems Union, an independent, international, multiplatform software developer, provides the SunSystems suite of integrated financial applications. SunSystems consists of eight financial management modules, including payables, receivables, client and general ledgers; project cost and time recording; purchasing; inventory control; order processing and invoicing; data management and report writing.

According to Morris, Systems Union's revenue reached $23 million last year, in large part because of a growth in sales of the UNIX versions, including HP-UX, of the SunSystems products. "We've been committed to HP as a platform since the early days of RISC. We now have between 50 and 100 users worldwide using the HP 9000," says Morris. "Out of 1,500 to 2,000 UNIX users, that's a sizable amount, when you think that the HP 9000 is a relatively new UNIX box."

According to Morris, Systems Union and HP have close links, particularly in Europe, where interest in UNIX is still higher than in the United States. One HP/SunSystems customer is Norsk Hydro, a Norwegian-based multinational company, principally engaged in oil and gas exploration and production, with interests in fertilizer and light metals.

According to Steve Thomas, systems accountant at Norsk Hydro Ltd. in London, the office purchased an HP 9000 Model 817 in September 1992 to replace a 7-year-old UNIX-based Convergent Technology Megaframe. "A prime consideration for us was to replace the old UNIX box with a new one," he says. "We looked at various UNIX systems but decided that HP had the best combination of price, low failure rate and low maintenance costs, along with a user base wide enough for us to buy software for it without any problem."

Norsk Hydro purchased Systems Union's SunSystems in October 1992 and has been running it live since January. "What we needed was a lot of analysis of our ledger accounts," Thomas says. "We looked at three different packages, but it was really only SunSystems that could provide the depth of analysis we needed."

Systems Union's SunSystems UNIX products are probably still more known in Europe, although sales are increasing in the United States According to Morris, "where we sell it and where it gets used are often very different." While U.S.-based customers, still true to IBM, may not use UNIX SunSystems at their domestic sites, they tend to buy the product for their subsidiaries doing business elsewhere in the world.

And the world of commerce is expanding. "We're doing very well in the Far East at the moment and in Eastern Europe," says Morris. "There is a lot of interest in Hungary, Czechoslovakia and Poland. We even have a Russian version." —*Sam Dickey, Contributing Editor*

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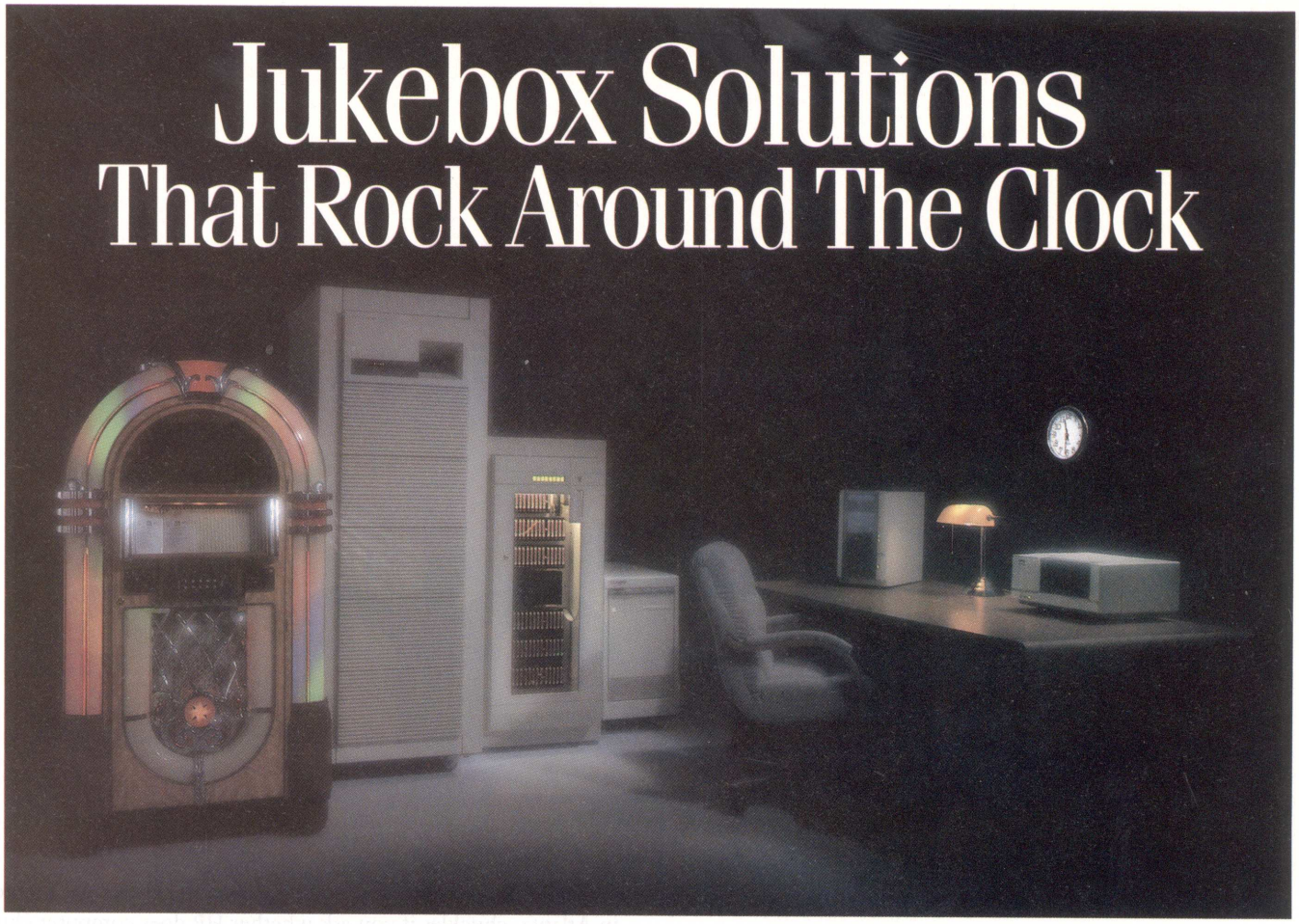

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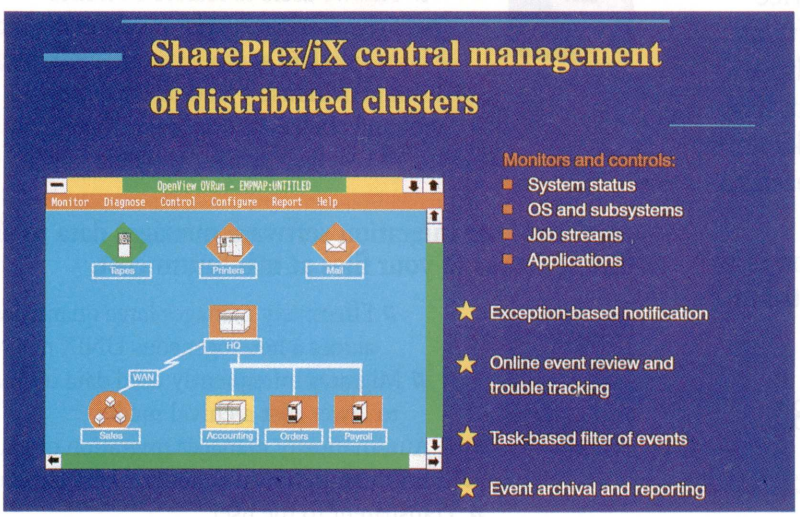
Come

HP's SharePlex/iX Offers Mainframe users yet another alternative when downsizing

BY BILL SHARP

Chris Rink, IT consultant at HP's Customer Response Center in Atlanta, chuckles if you ask whether HP does computer clustering. He sits in the midst of more than 80 HP 3000 systems linked together in a clustering system that handles all the data for HP sales and service for the United States.

But most of the world does not think of HP as making clusters — hot-shot minis and workstations, yes, but not clusters. Changing that image was just what HP had in mind when it formally introduced its clustering product, SharePlex/iX, this past March. This product, fruit of a joint development effort with Quest Software Inc. (Newport Beach, CA) is no idle add-on. What HP wants is to grab as much of the downsizing market as possible as customers flee big mainframes. And while they are at it, the HP gang is aiming to lure Digital Equipment Corp. customers away from those aging VAXcluster systems and onto PA-RISC. HP would like to generate as much stormy weather as possible for rivals IBM and DEC.



Together

When Hurricane Andrew carved a swath of destruction westward across South Florida, chills ran down Don Sheet's spine. Sheets is manager of business computer operations for Lockheed Space Operations in Titusville, FL. He knew his computer systems, which support logistics at Kennedy Space Center at Titusville, were safe, many miles north of the storm's path. But had Andrew come ashore at the Space Center, not only would Sheets have lost his computer Center — he might have lost the disaster recovery systems as well.

His disaster recovery plan for Space Center logistics has been a simple, but so far effective one. When a hurricane is forecast to approach the state, Sheet's crew loads one of the system's three HP 3000s onto a truck and heads 25 miles inland. Until Andrew's arrival, that seemed enough insurance — but not anymore. "We could have lost it all," he says.

Instead, the Lockheed team is setting up a SharePlex/iX cluster that will link systems at the Space Center, the inland facility, and a third computing center in Atlanta. Once the system is complete, signs of a serious hurricane will send the HP 3000/967 packing — this time for Atlanta. Future hurricanes will pose as little threat to space shuttle logistics as possible — and users will never know the difference.

This kind of capability has been costly or unavailable in computer systems before, and is possible now because of sophisticated software and networking capabilities.

So what exactly is a cluster anyway? According to a report on computer clusters published by the Aberdeen Group Inc., (Boston, MA.), a cluster is a multinode computer system that provides:

- The appearance of one system.
- Improved availability.
- Cluster-wide management features.
- Shared print, batch, file and peripherals capabilities.
- Incremental growth path.
- Flexible connections.

Benefits to users include:

- The ability to build large, flexible and powerful computing systems out of smaller and more economical computers.
- Prolonged useful life for older systems by linking them with newer systems and parceling out jobs according to the capabilities of each component computer. In fact, DEC maintains some well-aged 11/780s still function in VAXclusters. HP says its SharePlex/iX will work with older MPE V, as well as MPE/iX HP 3000 systems.
- Improved availability of computing resources by providing for quick switchover to a second node in the event any node on the system fails. In the case of HP SharePlex/iX, switchover might require 15 minutes.

Digital has been selling VAXclusters for years, and is the acknowledged leader in cluster technology using its VAX line. But without volume shipments of Alpha VAX systems, DEC customers pay a steep performance penalty. Other vendors offering clusters include HP, IBM and Sun. And, surprise, while HP does rank behind DEC in cluster capability, it is clearly ahead

of other vendors, including IBM as seen in the Aberdeen Group rating table on clusters in Figure 2. Unfortunately, HP's clusters are standouts for only its 3000 family. HP-UX users have to wait until next year, when rumor has it SharePlex/iX moves to the HP 9000 realm. HP won't commit to this publicly.

Folks looking to expand into HP 3000 systems have more to get excited about with SharePlex/iX around, says Bryan Dean, SharePlex/iX product manager in Cupertino, CA. Compared with DEC's VAXclusters, he says, HP's SharePlex/iX is less costly, although, because the clustering capabilities are soft-

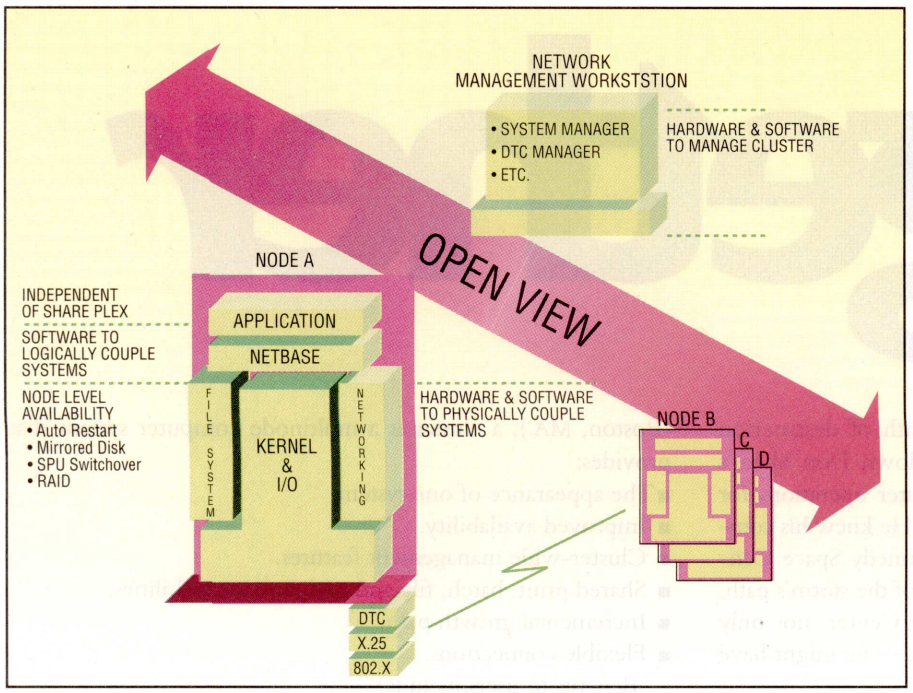


Figure 1: SharePlex/ix: System Structure

ware-based, switchover is slower than with the more tightly configured VAXclusters. VAXclusters, meanwhile, are restricted to 40 km distances by their tight, proprietary hardware links, according to Dean, while HP clusters can include nodes in New York, Dallas and San Francisco, with longer links possible using its standards-based networking.

Dean says cost comparisons between IBM mainframe systems and an HP SharePlex/iX cluster look even better than comparisons with VAXclusters. "For about one-third the cost of an application set up on an IBM mainframe used as a data engine, we can put that application on two or three high-end HP 3000 systems in a cluster, with data replicated on all three systems and spread them out geographically," says Dean. "You can have redundant servers all mirroring data. You can also have redundant clients."

The reasons for moving into clustered systems can be varied. In some cases the overriding concern is ensuring that the system stays functional even if a node is lost. In other cases, clusters provide a means to build a powerful large system at lower cost than buying a mainframe, while preserving the use of older systems. In some cases, growth in system use alone moves users to consider a cluster.

Borland International of Scotts Valley, CA. has a high volume of telephone sales. On a typical 8-hour shift, the company receives 14,000 to 21,000 orders received by 150 telephone sales people. Its computer system uses two HP 3000/980 systems located a mile apart in a cluster using NetBase software from Quest, which is also part of HP SharePlex/iX. In the event of a computer failure, they find they would need 15 minutes to get the system up and running on the other HP 3000.

Before moving to a cluster, says Dean, Borland found that when a large query function ran during peak load business hours, the combination of computing traffic from the query and the more than 100 OLTP transactions from the operators began to overload the system. Using Netbase, Borland now reserves the primary computer for OLTP operations, while shadowing the entire application to the second computer so it is ready to take over at any time. Large front office jobs such as queries run on the backup system so critical OLTP business is not affected.

HP's SharePlex/iX is not a single, monolithic product, but a series of products working in concert (as this magazine has noted in the past, this is the future direction of most large computing solutions). In this sense, SharePlex/iX provides an umbrella structure under which other products reside to provide capabilities.

Key components in the SharePlex/iX system include:

- NetBase node coupling software from Quest, which provides network file access, print spooling, shadowing to replicate data or applications across a LAN or WAN and AutoRPM for transparent execution of networked applications. NetBase has been on the market as a separate product from Quest for a while, predating SharePlex/iX.
- OpenView System Manager provides cluster-wide monitoring from a single point.
- OpenView Distributed Terminal Controller provides central management of all terminal controllers.
- MPE/iX SPU Switchover provides changeover from one node

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to another in the event of system failure without idle standby requirements.

HP and Quest did codevelopment work on SharePlex/iX, says Dean. "We had to make the products talk to each other to allow them to hook us, and us to hook them," says Dean. "It added considerable value to the product."

Functionally, the system comes down to a series of nodes. Each HP 3000 is a node, and has a structure shown in the SharePlex/iX diagram. Netbase sits between the operating system and the applications, which means the application for the most part need not take into account the fact that instead of a single HP 3000, it may be dealing with several — all it "sees" is NetBase. NetBase handles links to the file system, networking and the Kernal and I/O structure.

HP OpenView Network Management is an important addition to SharePlex/iX because of its ability to identify system faults down to a functional block (such as the file system) on a specific node of the cluster. From a single location in the cluster, OpenView can monitor each of the nodes.

With all the flexibility and capability SharePlex/iX provides, the structure of a cluster has an inherent weakness that springs right out of its primary strength: It is composed of multiple systems. Because of this, users need to look at the applications they use as a guide to where clusters are best used, and not used.

Oversimplified, it comes down to a tradeoff of performance versus availability.

Performance — While SharePlex/iX can bundle up a series of HP 3000 systems to function a lot like a mainframe, there always will be some loss of performance because of the movement of data between processors. For some applications where even minuscule time losses are critical, a single large system may perform better than a cluster.

Availability — Other applications require that even in the face of disaster, say, when a computer is lost in a fire, service cannot be lost for more than a few minutes. Hospital data systems, emergency 911 services and mail order houses often cannot afford downtime. Dean quotes a U.S. government study showing that of businesses that suffered disasters and failed to get computer systems running in one week, half were out of business within a year. Where requirements for availability outweigh performance needs, clusters provide a cost-effective tradeoff.

For those looking toward clusters, segmentation is key. Clustered systems are most efficient when tasks are organized to reside on specific computers. You might create segments such as phone support, manufacturing, order fulfillment, inventory control and accounting, or you might use geographic breakdowns such as those employed by Rink at HP's customer response center.

"We used to have separate data centers around the United States, but now we have this one location with a lot of things bro-

	Digital Open VMS	IBM MVS Sysplex	IBM RS/6000	HP 9000 HP-UX	HP 3000 MPE/iX	Sun Solaris
Setup & Operations						
1. Modifications	5	3	2	2	5	1
2. Transparency	5	5	3	3	5	2
3. Open Standards	5	2	5	5	3	3
4. System Naming	5	1	1	2	5	1
5. Scalability	4	3	2	2	4	2
System Management						
1. Administration	5	3	2	2	4	2
2. Console management	5	4	2	2	5	2
3. Batch & print queues	5	4	5	5	5	5
4. File system management	5	4	3	3	5	2
5. Multiple clusters	4	3	3	4	4	2
6. Multiple version support	3	3	1	1	5	1
7. Multiple OS support	1	1	1	1	1	1
Availability Functionality						
1. Automatic recovery	4	3	3	3	4	3
2. Automatic failover	5	4	4	4	4	4
3. No single failure point	5	4	4	4	4	4
4. Application (software)	4	1	3	3	3	2
5. Application (hardware)	5	5	4	2	3	3
6. Cluster OLTP	4	2	2	2	4	2
7. Disaster tolerance	5	4	3	2	4	1
User Resource Sharing						
1. Common file system	5	3	2	2	4	2
2. Common print & batch	5	4	4	4	4	4
3. Node-independent storage	4	2	2	1	1	1
4. Load balacing	5	3	3	2	3	2
5. Single user authoriation	5	4	2	2	2	3
Unweighted Average	**4.5**	**3.1**	**2.8**	**2.6**	**3.8**	**2.3**

Figure 2: Table from the Aberdeen Group report on clusters.

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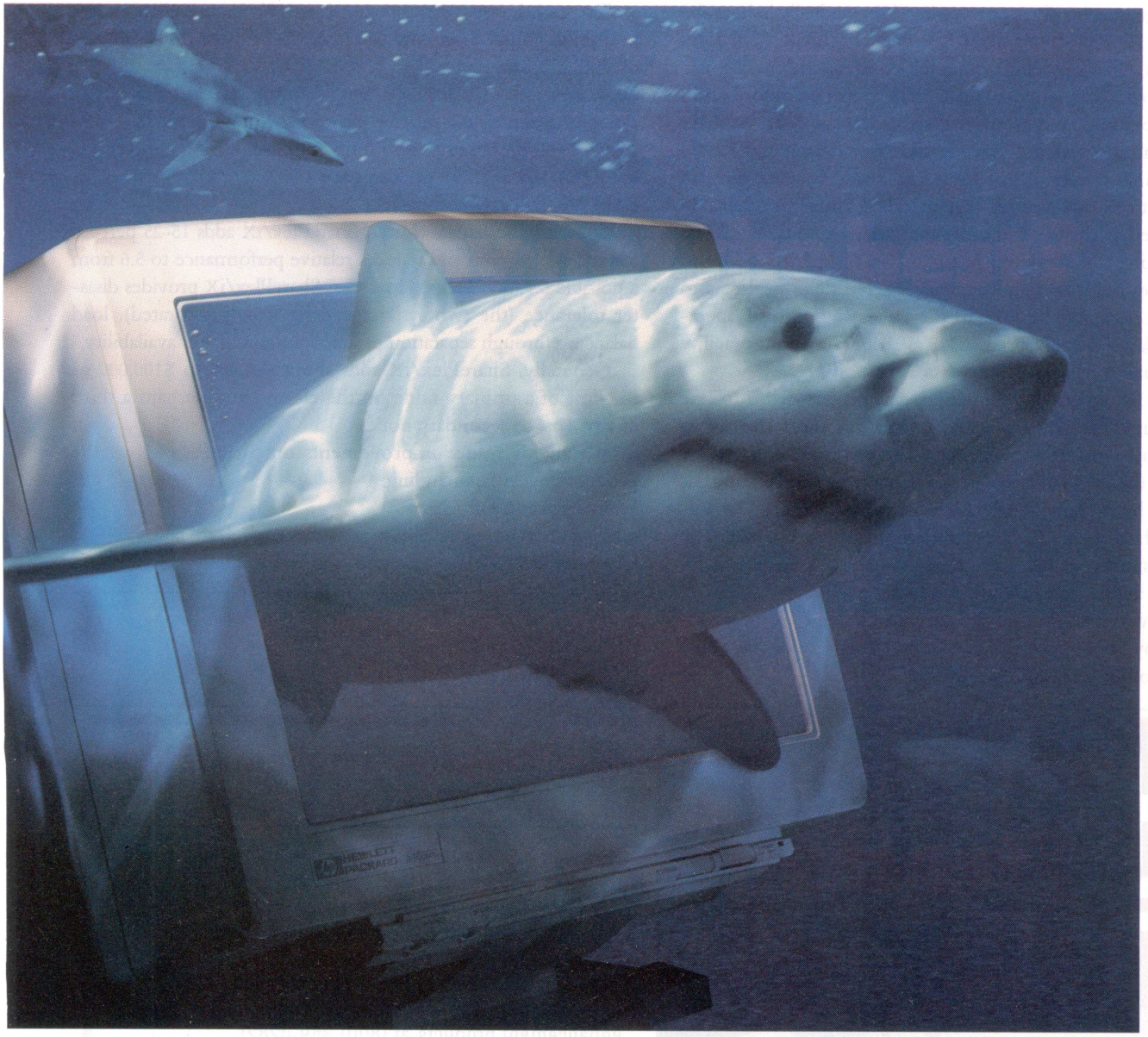

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ken down geographically for processing." By gradually linking the facility's 100 HP 3000s into a massive, segmented cluster, Rink saves on resources while providing disaster tolerance and high availability.

"We have a tremendous amount of common information in these operations, and NetBase gives us the capability to share that on common systems," says Rink. "For example, we used to maintain 40 copies of pricing information, because most of our applications drive off of that in one form or another. By putting together clusters and using NetBase, we've reduced that to maintaining one copy of pricing."

Rink uses NetBase to automatically replicate critical data to ensure that it cannot be lost. In the same way, critical operations in Atlanta are mirrored at HP's Colorado Springs facility half a continent away to ensure data availability.

Because HP consolidated multiple data centers down to one in Atlanta, it managed to generate savings that more than offset the additional costs of implementing clustered operations. Rink reports that the pricing database consolidation reduced pricing database costs by 80 percent, and pricing hardware costs by 68 percent. "We have ten reference applications like pricing, and all of those have similar savings," says Rink, although he notes that for many other applications, savings would be smaller.

"We have probably reduced unavailable time for most applications by 50 percent and can switch applications from one node to another in 15 minutes or less."

To provide some cost perspective, HP's Dean built us a hypothetical comparison between large and clustered HP systems of similar performance.

Large system — HP 3000 992/200, featuring big centralized type processing and an HP relative performance rating of 6.0.

Cluster — composed of two units (minimum for a cluster):

- HP 992/100, relative performance 3.5.
- HP 977, relative performance 2.6.

On the hypothetical cluster, SharePlex/iX adds 15-25 percent to total system costs and reduces relative performance to 5.6 from a possible 6.1, says Dean. However, SharePlex/iX provides disaster tolerance (the two systems can be widely separated), load balancing through separation of functions and higher availability.

Generally, SharePlex/iX adds about $20,000 to $100,000 to the cost of a primary node on the cluster, and perhaps a third of that cost to secondary nodes.

Watch for future improvements on SharePlex/iX as the product develops, including:

- Moving onto HP-UX.
- Faster switchover capability in the event a node fails.
- Improved OpenView functionality across clusters.

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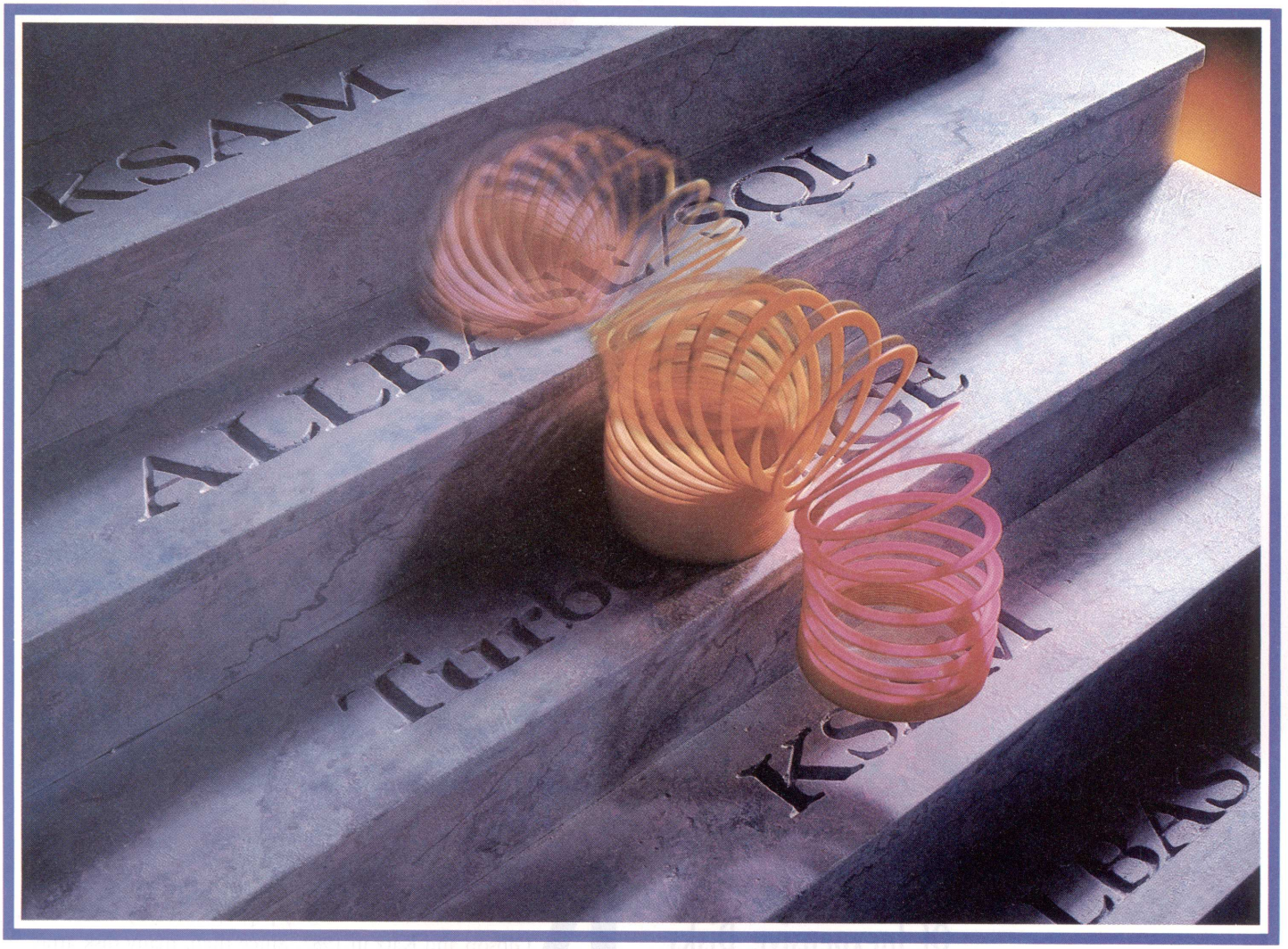

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RAID: Use As Directed

Redundant Arrays Of Inexpensive Disks Could Give Your Systems A Performance Boost, But RAID's Number One Advantage Remains Reliable, High-Availability Storage

Redundant Arrays of Inexpensive Disks (RAID) were first described in a Berkeley paper written by Patterson, Gibson and Katz in 1987. Since then, many disk array products have been shipping in volume. Because so many have been installed and integrated into high availability systems, there is a better understanding of disk arrays in the computer systems' market.

Lately, it's become increasingly common to see advertisements and articles claiming that RAID can speed disk I/O and enhance systems performance. But despite all the publicity and, in some cases exaggerated, claims by vendors, high data availability is still the primary purpose — and number one benefit — of disk arrays.

When you configure a disk array in data protection mode,

BY ED PAVLINIK

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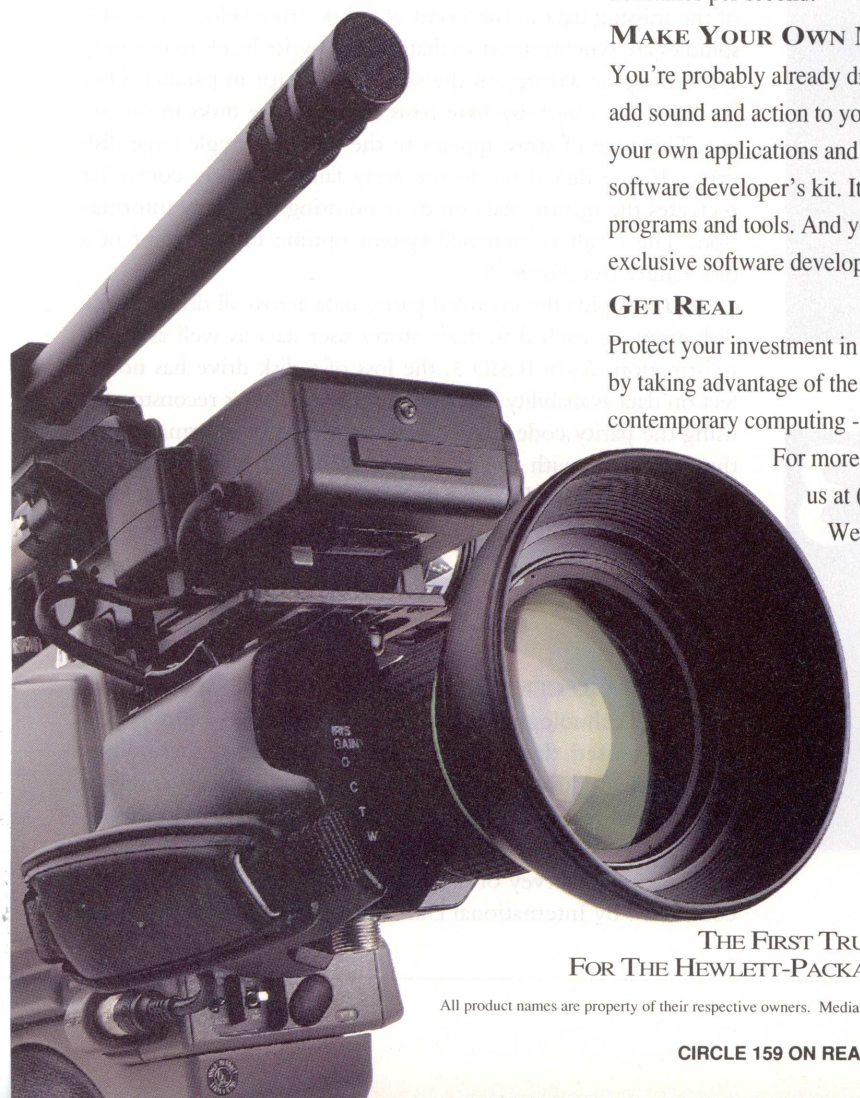

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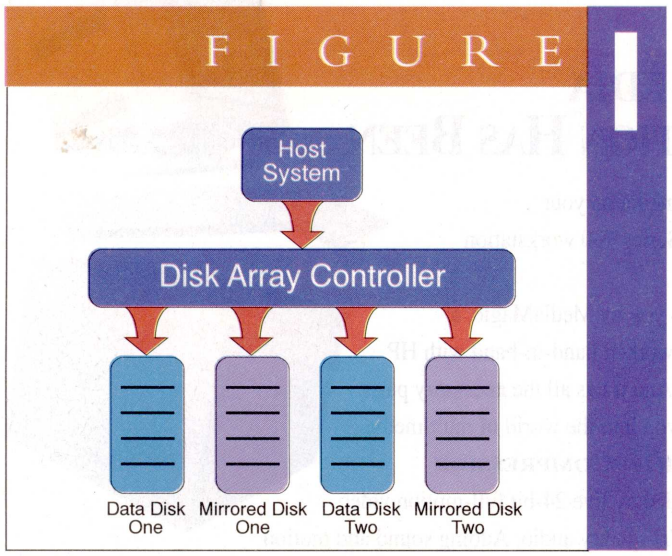
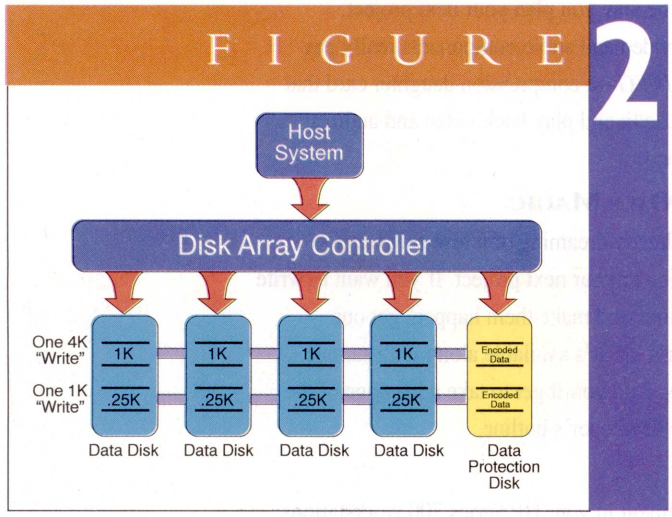
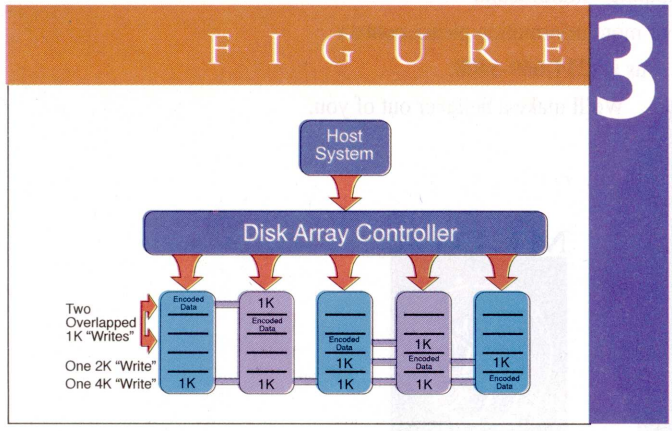


RAID Level 1 makes use of mirrored disks.



RAID Level 3 employs a separate disk to store parity information.



RAID Level 5 stores parity information across all drives in the array.

a disk drive may fail, yet the system continues to run and users don't even notice the disk drive failure. With a non-arrayed disk drive, a failure literally will bring the system to a halt, even perhaps forcing a reload of the data.

The disk array achieves this high data availability through several configurations, each classified as a unique RAID level. What follows is an overview of the three most commonly implemented RAID configurations (levels 1, 3 and 5). Notice that there is no particular significance attached to the ranking order of RAID levels, a higher level does not mean that the implementation is better or offers higher performance than that of a lower RAID level.

RAID 1 mirrors individual disk drives, so that a duplicate copy of your data is stored on a second disk every time a disk write occurs. When a disk drive fails, the array controller automatically switches all system I/O activity to the surviving drive. RAID 1 mirroring is accomplished within the disk array under direction of the array controller. This is different from Disk Mirroring or Datapair executed under operating system control that duplicates 100 percent of all disk subsystem components and requires special applications software (see *Figure 1*).

RAID 3 disk arrays use a separate data protection or parity disk to store encoded information. This permits reconstruction of the missing data in the event of a disk drive failure. The disk spindles are synchronized so that all read/write heads in the array are reading or writing on the same data sector in parallel. Data is striped on a byte-by-byte basis across all the disks in the array. This type of array appears to the host as a single large disk drive. If one disk drive in the array fails, the array controller recreates the missing data on demand using the parity information. The result is increased system uptime in the event of a disk failure (see *Figure 2*).

RAID 5 splits the encoded parity data across all drives in the disk array, so each disk drive stores user data as well as parity information. As in RAID 3, the loss of a disk drive has no effect on data availability, because the missing data is reconstructed using the parity code. RAID 5 writes blocks of information on the disk array with the parity for each data block stored on another disk drive. If one disk drive is lost, the parity information remains intact on another disk (see *Figure 3*).

The Market Array

AT A RECENT DISK ARRAY Conference sponsored by Technology Forums, many analysts and vendors presented their views on RAID markets, technology and trends. Industry consultants, who have looked closely at the demand for disk arrays and surveyed customer sites to assess awareness of the technology, presented their findings.

One recent survey of more than 5,000 data processing sites, conducted by International Data Corp. (IDC), found that a sig-

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RAID often lowers performance, protecting against disk mechanism failures, not software-related data loss.

nificant number of mainframe sites plan to downsize to cut costs and move to open systems in the coming year. Study of the storage availability at these sites, revealed that the cost of storage-related downtime ranges from $1,000 to $10,000 per hour. Not surprisingly, IDC also discovered that many of these mainframe sites were willing to pay a premium for high-availability storage and that an increasing number were considering an implementation of RAID technology.

Another major finding of IDC's study was that users across most major hardware platforms, including mainframes, proprietary minis, open systems servers and workstations, were increasingly sensitive to data reliability and system availability problems. In some markets, there was a willingness to trade performance for the resultant higher availability RAID provides. IDC estimated the total market for RAID (including 3990, RAID 1, and IBM dual copy) to be $2.1 billion for 1992, growing to $9.8 billion in 1996. This explains, at least in part, why so many vendors plunged into the RAID market last year.

Solution Or Snake Oil?

THROUGH ITS MARKET RESEARCH, IDC also has debunked certain myths about RAID, including the misleading idea that RAID always improves performance and spurious notions that RAID provides continuous availability or eliminates the need to back up. In fact, RAID often lowers performance, and it protects against only disk mechanism failures and not software-related data loss. Disk mirroring provides a much higher level of data availability than RAID, albeit at a higher price, and RAID, unlike some mirroring technologies, is not a replacement for disk backup.

Some analysts with opposing views look at disk arrays with disdain, comparing them to "snake oil." They claim that thus far arrays have been unable to deliver on the original promise of the technology and see disk mirroring as a better solution for certain applications.

Why the mixed reviews? As mentioned earlier, the primary differentiator of the disk array is high data availability, which allows a system to maintain its function even in the event of a disk failure. However, this data protection feature extracts from disk array performance for small block size transfers. In many cases, a group of individual non-arrayed disks will perform better than a disk array when measured by the number of transactions per second.

That's why it is important to match the I/O per second demand of the application to the capabilities of the disk arrays configured on a system, particularly with small, performance-sensitive applications. The debate over disk arrays will continue because performance is not the primary differentiator of the product, despite widely varying claims on this subject.

The Best RAID Plans

YOU MUST PLAN CAREFULLY when configuring disk arrays to match and load balance system I/O demand, particularly when replacing large numbers of smaller capacity disk drives with fewer large capacity disk arrays. The older disk drives in aggregate may have more total I/O capability than the disk arrays replacing them, even though the total storage capacity may be the same. Consequently, it may be advantageous to configure multiple smaller capacity arrays on a system rather than a few large capacity arrays to provide more devices over which to spread the I/O workload.

Performance in general is complex and depends on the system and its applications, including such factors as the read/write ratio, data transfer block size and the random nature of the data requests. Because disk drives are electro-mechanical devices, it may take a relatively long time to move an actuator arm containing the read/write heads to the correct track on the media surface. Therefore, sequential data can be accessed much quicker than completely random data, because little or no actuator movement needs to occur.

Once on track, the data is read off the media, sent to the disk controller and then to the host system. The time to transfer data depends on the size of the data block requested. For short transfers such as 8 KB, transfer takes approximately one millisecond. As the block size increases, however, the actual time spent doing the transfer gets larger in relation to the seek time.

RAID 3 array performance is predictable and independent of the read/write ratio. For small transfer sizes (less than 32 KB) performance is comparable to the performance of a single disk drive. For large block sizes (greater than 32 KB), RAID 3 will process I/Os quicker than single disk drives because of the faster transfer rate achieved from the parallel operation.

RAID 5 disk array performance varies considerably depend-

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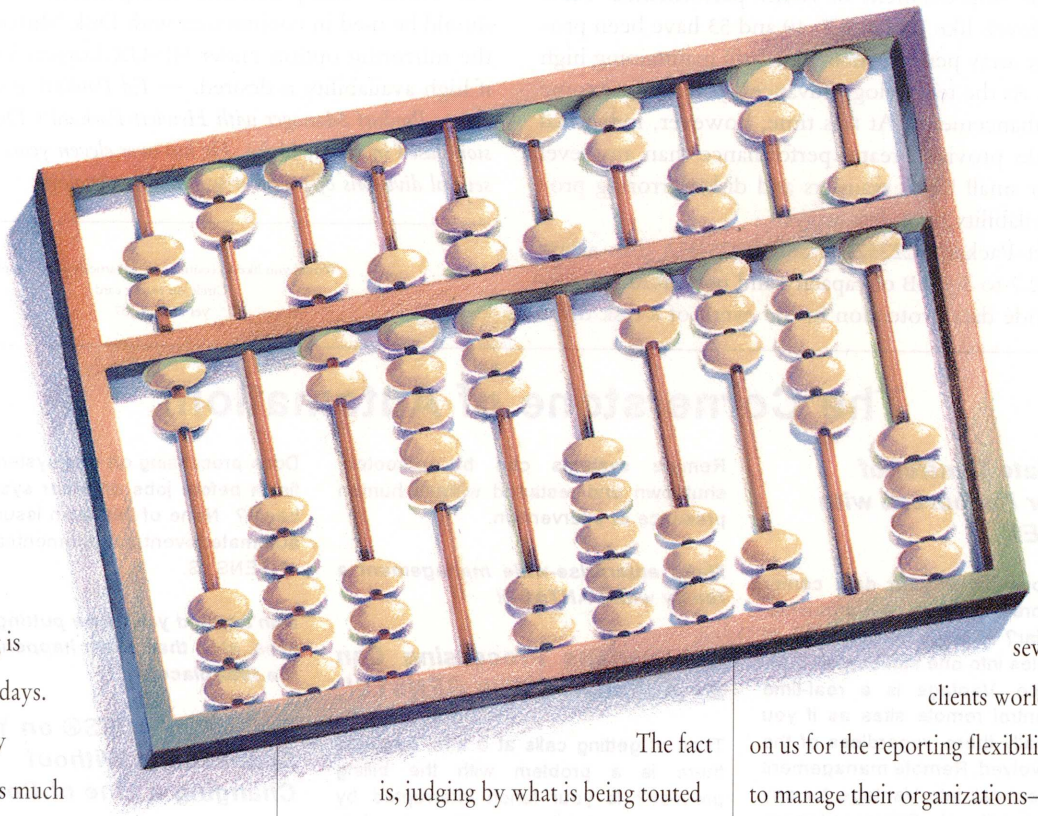

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ing on the read/write ratio. For 100 percent read applications, performance is similar to conventional disk drives; however, as writes are processed, performance slows down, because of the method used to update the parity information. If users can predict what their applications will request in terms of percentage of reads versus writes, they will have a better chance at predicting RAID 5 disk array performance.

RAID For Realists

AN ENORMOUS AMOUNT OF R&D capital is going into the improvement of RAID performance. New RAID levels like RAID 6, 7, 10 and 53 have been proposed to increase array performance while still maintaining high data availability. As the technology advances, you may see some performance enhancements. At this time, however, individual non-arrayed disks provide greater performance than any level of disk array for small block transfers and disk mirroring provides higher availability than disk arrays.

The Hewlett-Packard C2252HA and C2254HA disk arrays currently offer 2.7 to 5.4 GB of capacity and use a RAID 3 parity disk to provide data protection in the event of a disk drive failure. All disk modules are hot-pluggable (capable of being withdrawn or inserted with power on) and the host bus adapter is HP-Fiber Link which uses an optical fiber cable available in lengths of 30 to 500 meters. The 2.7 GB arrays can be used to meet smaller storage capacity needs, as well as for applications that need more I/O performance, through configuring multiple smaller capacity devices. These arrays are supported on both HP-UX and MPE/iX multiuser systems.

HP also offers a high performance array mode of operation currently supported under HP-UX 9.0, called Independent Mode. This is a subset of RAID Level 0 and allows concurrent accesses to all disks resulting in higher I/O rates than RAID 3, but without data protection. Independent Mode of operation should be used in conjunction with Disk Mirroring or else with the mirroring option under HP-UX Logical Volume Manager if high availability is desired. — *Ed Pavlinik is currently the Disk Array Product Manager with Hewlett-Packard's Disk Memory Division based in Boise, Idaho. He has over eleven years of experience with several divisions of HP in new storage technology.*

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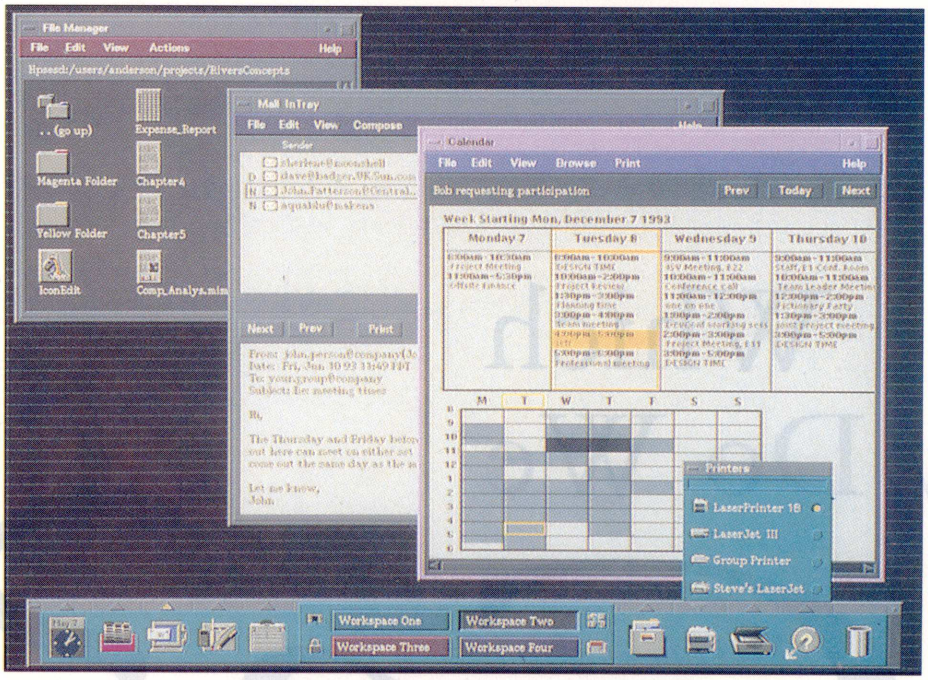

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Which Way Do We Go?

For LAN And WAN Integration, Freedom Of Choice Is Rarely Risk Free

BY PAULA JACOBS

As the need for high-speed internetworking standards receives more and more attention, the plethora of new technologies becomes somewhat overwhelming. Fast Ethernet, Fiber Distributed Data Interface (FDDI) and FDDI-over-copper are competing for the LAN integration market, while Frame Relay, Asynchronous Transfer Mode (ATM) and Switched Multimegabit Data Service (SMDS) contend for high-speed WAN interconnection.

Through all these choices, a few observations: vendors, users and consultants alike agree that the TCP/IP protocol has become more popular, bandwidth requirements are increasing by leaps and bounds, and some of the new technologies still have far to go. And while high-speed WAN connections enable the

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latest and greatest applications, multimedia in particular, few organizations deploy multimedia on a large scale.

As the number of applications on the network expands dramatically, increased bandwidth has become a priority item. That's why, despite their respective shortcomings, Frame Relay, ATM and SMDS have attracted such interest in the WAN market.

Despite their respective shortcomings, Frame Relay, ATM and SMDS have attracted interest in the WAN market.

Generally implemented in software, Frame Relay represents the first generation of fast packet. It is faster and more cost-effective than X.25 and is quickly becoming a measurable market. International Data Corp. says that 38 percent of users planning to implement TCP/IP also expect to migrate to Frame Relay services. The number of private Frame Relay installations continues to rise, while carriers such as MCI, AT&T and Sprint have announced plans to expand their Frame Relay coverage.

ATM uses cell-based technology that enables high-speed transmission of video, voice, image and data simultaneously at multimegabit and multigigabit rates. "People are excited about moving to the future, and ATM will offer more seamless integration once carrier services are available," says Charles Robbins, director of Communications Research at The Aberdeen Group, a Boston-based consultancy.

However, while AT&T and Sprint have both announced plans to introduce ATM-based services over the coming year, the demand for multimedia from users remains scarce. Possibly because, few real ATM products exist today, standards have not been finalized, and pricing is still relatively high.

SMDS is a high-speed, packet-switched service designed to be more cost-effective than private-line services. However, SMDS is not fully supported across WANs. Nor has it achieved the success originally predicted, although some experts say that SMDS will retain a foothold in certain niche applications. In any event, long-haul carrier MCI Communications has announced plans to deliver SMDS services, while AT&T has indicated that SMDS services will depend on actual customer demand.

Technology Versus The Real World

FIDELITY INVESTMENTS in Boston is evaluating the merits of FDDI, Token Ring, Frame Relay and ATM technology, according to Systems Manager Jim Doherty. The company uses HP OpenView to manage a distributed network environment, including 6,000 devices across the United States. Currently, the company has an IP-based network with a variety of hubs, routers and gateways. Doherty says that Fidelity plans to construct an FDDI ring in metropolitan Boston and hopes to take advantage of ATM as soon as it is robust.

"The problem is that bandwidth is expensive, and our bandwidth is saturated because of network growth," says Doherty, who explains that his firm conducts rigorous testing before committing to a technology. "We need a flexible design to accommodate growing bandwidth requirements, making the bandwidth affordable for new applications, with integration crucial for technology selection."

Fidelity is evaluating Frame Relay for on-demand applications and FDDI for faster delivery of services in the Greater Boston area. Doherty expects that Frame Relay will be installed in the near future, and FDDI will be installed in the fourth quarter of this year.

Culture Shock

THE AMERICAN RED Cross national headquarters has a large Token Ring network that connects campuses in Washington, DC, suburban Maryland and Virginia. All together, there are 20 Token Ring networks interconnected over a fiber optic backbone, using a T1 link. The system configuration includes four HP 9000 systems used as application servers, one HP server running HP OpenView network management software, Novell file servers, AS/400 computers, PCs and Novell LAN Workplace for DOS.

"Reliability is key," says David Willis, manager technology integration, at the American Red Cross. Ideally, Willis would like speeds at lower costs with better reliability of T1 services. Presently, nine T1 circuits in the Washington, DC area provide fiber transmission, but problems with routers, DSUs and other equipment are not uncommon.

The American Red Cross Metropolitan Area Network relies on point-to-point T1 instead of packet because of performance concerns. Other factors influencing the point-to-point T1 implementation include cost and availability, since packet services became available only recently in the DC area.

One of the biggest problems Willis has faced is the dearth of appropriate monitoring tools suitable for LAN technicians. "As soon as you leave the building through the public switch network, there is a clash of cultures with two completely different languages," he explains. "Ideally, I would like tools

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to identify what percentage of the T1 link, for example, is being utilized."

The American Red Cross dedicates resources to fiber services, such as metropolitan fiber systems. Willis says that these are areas that require less protocol translation than the current strategy of running serial lines.

As UNIX moves into the commercial environment, more and more HP sites are adopting TCP/IP.

Beyond the X.25 Standard

COMPANIES WITH GLOBAL networking requirements no longer are limited to the use of the X.25 networking standard. As UNIX moves into the commercial environment, more and more HP sites are adopting TCP/IP, which International Data Corp. indicates is now the most widely used enterprisewide network protocol after SNA/SDLC. Many HP installations are also revamping their networking strategy in order to achieve greater efficiency and reliability.

One such HP customer is the Foxboro Company, a process-control manufacturer based in Massachusetts, whose WAN connects approximately 4,000 worldwide employees in Texas, Massachusetts, England, Germany and Holland. There are also six LANs worldwide, each with its own UNIX servers, all standardized in PC NFS.

Foxboro headquarters has a campus network that connects three manufacturing facilities over an FDDI LAN. For enhanced reliability, the entire network is segmented, with Wellfleet routers on each subnet. The configuration includes IBM mainframes, HP 9000 and HP 3000 systems running MPE and HP-UX, Sun workstations, and a LAN with approximately 2,500 PCs running DOS and PC NFS. The network supports word processing, spreadsheet and E-mail applications, while an HP 9000 server supports factory automation applications.

"When we installed our new UNIX systems, we needed to make the LAN as fast as possible," says Foxboro Principal Engineer, Al Sonnenberg. "We chose FDDI because of its higher throughput and increased reliability.

"Reliability is a huge concern, particularly for our HP-UX system that drives the manufacturing process," he says. "We have a fiber optic backbone, and the network is segmented so well that if one section breaks, we don't have to worry about high downtime across the entire network."

According to Sonnenberg, even the WAN technology is now completely TCP/IP and does not use proprietary protocols. The WAN is used primarily for file-sharing and E-mail. For example, a user on a PC in Germany must be able to access the HP-MPE system in Massachusetts.

Foxboro uses Walker Richer & Quinn Inc.'s Reflections Network Series for PC-to-host connections. "We wanted to find a way to enable every desktop in the company to share files," says Sonnenberg. "However, one problem is that HP-MPE still resides on proprietary protocols, which makes it difficult to do remote printing without X.25."

Currently, several wide-area networking alternatives are used at different company sites. For example, in Texas, there is a 56-KB T-service carrier to Europe, while in Massachusetts, X.25 is used over the local area and then connects with a public carrier.

To achieve greater efficiencies and cost savings, Foxboro's overall strategy is to eventually eliminate the use of X.25. New York-based InfoNet provides the company with WAN services, including Ethernet connections and network configuration maintenance. InfoNet services are used for WAN interconnection with Germany and will soon be implemented for connection with England and Holland.

The Bottom Line

WHILE EMERGING TECHNOLOGY holds considerable promise, most users agree that practical realities must hold true. Therefore, throughput, cost and reliability are key factors in choosing technology.

The Foxboro Company's strategy is not to try technology until it has conducted thorough testing. While the company is evaluating the potential of ATM, Sonnenberg said that it is not ready to pilot and test ATM until standards emerge.

David Willis of the American Red Cross agrees. "I don't think ATM is near," he says, "and it still seems far from when there will be a real product at a reasonable cost. ATM is exciting from a pure specification level, but we are not putting resources on [ATM], since it is still a few years away."

"User concerns are stability, internetworking and cost," says Michael D. Millikan, vice president of programs at The Interop Company. "Initially the argument against ATM was its high cost, but it is still a significant technology. But cost-effectiveness is key. That was FDDI's problem, and now, there are too many alternatives." — *Paula Jacobs is a consultant and writer based in Framingham, Massachusetts. She can be reached at* pjacobsworld. std. com.

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NETJet Goes The Distance

Emulex's NETJet Provides Users With Direct Access To Network Printers At Direct-Flight Speeds

When flying between cities to attend an important business meeting, most people prefer to go direct, to avoid detours and other delays. Likewise, when you've sent a report flying over the network to prepare for an executive meeting that starts in five minutes, the last thing you need is a bottleneck or detour on the way to the printer.

Most network users already have discovered the Murphy's Law of output demand: If you need it now, wait. This is even more applicable to remote printers connected to a workstation and shared by other network users, and it is especially true of network or remote printers that serve interconnected TCP/IP, Novell, AppleTalk or DEC LANs.

On many networks, jobs are sent to a print server that in turn spools to one or more network printers. First your document is reassembled as it arrives at the print server's network adapter. Then it is sent over the print server's internal input/output (I/O) bus to a spoolfile on the local hard drive. After the whole job is transmitted to the spoolfile, it gets sent over the machine's internal I/O bus again to a parallel or serial port for transmission to the printer. With remote printers, the print stream is slowed down even more as it gets interleaved with processes being run by the workstation owner.

In travel parlance, this is like trying to catch a connecting flight by riding a local bus to the next airport. Now, however, Emulex Corp.

Steve Lamond

NETJET

OBSERVATIONS:

- Allows printer sharing across TCP/IP, Appletalk, Novell NetWare and DEC LAT protocols.
- Accommodates Ethernet/IEEE 802.3, Ethernet Type 2, 10Base-2 ThinWire (BNC) and 10Base-T twisted pair (RJ45) cabling.
- Features Remote Console Facility for remote change of NETJet parameters or for monitoring status.
- Remote login access protected by double layer of password security.

PLATFORM:
HP LaserJet IIISi,LaserJet 4, LaserJet 4Si, PaintJet XL300 or DesignJet Plotter

PRICE:
NETJet with one protocol costs $529 and additional protocols cost $50 each ($679 for a fully configured NETJet). Prices vary if you order protocols after buying the basic product.

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(Costa Mesa, CA) allows your network print jobs to jet to their destination directly.

Emulex's NETJet is an Ethernet interface card that allows printer sharing across TCP/IP, Appletalk, Novell NetWare and DEC LAT protocols. NETJet functions as a remote print server that plugs into the Modular I/O (MIO) slot of an HP LaserJet IIISi, LaserJet 4, LaserJet 4Si, PaintJet XL300 or DesignJet Plotter. Software is included for assigning a TCP/IP address and for logging onto the NETJet from a NetWare host.

The NETJet accommodates as many physical cabling arrangements as it does protocols: Ethernet/IEEE 802.3, Ethernet Type 2, 10Base-2 ThinWire (BNC) and 10Base-T twisted-pair (RJ45). I installed the NETJet on Novell and HP-UX workstations interconnected by Ethernet ThinWire. Installation of the board in the HP printer, a 4Si, was uneventful. The 4Si MX comes standard with separate TCP/IP and AppleTalk boards, but you may eventually want to free a slot for another MIO device.

Anyone with modest LAN-administration skills can configure NetWare to support the NETJet. All you need to do is go into PCONSOLE and create or select a print queue; define a new remote printer named NJA_xxxxxx_1, where xxxxxx is the Ethernet address printed on the NETJet board; then stop and restart the Novell print server. To let your users print to the NETJet through individualized printer ports at each workstation, all you need is a CAPTURE statement in each login script.

To install NETJet on UNIX systems, you need even fewer skills. Emulex supplies preconfigured host utilities for AIX RS/6000, AT&T 386, SCO 386, SPARC and VAX ULTRIX systems, but the install script will compile system-specific host utilities from the source code for most others, including HP-UX. All you need is a C or FORTRAN compiler and support for the **uname** command. The install script takes care of the rest, including running a test printout to confirm the parameters you selected.

NETJet features a Remote Console Facility (RCF) port so that you can remotely change NETJet parameters or monitor the status of the board. To log into the RCF from a Novell host, you need to install the Kermit protocol and TES terminal-emulation program, which are supplied on a DOS diskette. To log into the RCF from a TCP/IP host, you use the **telnet** command.

The NETJet's RCF command set allows you to display or change NETJet configuration parameters. The **show port mio status interface** command displays the status of the MIO port in which the NETJet is installed. It gives you the name of the product, software revision level and MIO port status.

The **show port mio status device** command provides information about the printer, as shown in *Figure 2*. This is especially useful if your LAN customers are spread out or you have a large number of network printers. The NETJet allows you to check the status of the printer's electronics and its supplies without leaving your seat.

If invoked from a VT100-compatible terminal, **show server characteristics** displays, in five overlapping status screens, NETJet's currently supported protocols, Ethernet and IP addresses, TCP/IP parameters such as subnet mask, and Novell and LAT environment parameters. For working from non-VT100-compatible terminals, the RCF command set also includes subcommands for displaying specific subsets of this information.

The NETJet's **show** commands don't update dynamically, so they give you only a snapshot of NETJet status for a single instant in time. By substituting **monitor** for **show**, however, you can have the RCF update the status screen every few seconds. This can be particularly useful when you are troubleshooting thorny network problems. For example, the cable attached to the NETJet has a poor connection, resulting in intermittent operation. By using **monitor port mio status interface**, you'll be able to see the status indicators come and go as the connection makes and breaks contact.

Using the RCF commands to change parameter settings is simple. You use the **set** command to temporarily change a parameter, **define** to make a permanent change that takes effect after you log out of or reinitialize the NETJet, and **change** to make a permanent change that takes effect immediately. Remote login access to the NETJet is protected by a double layer of password security to prevent unauthorized use. Both passwords can be changed by the NETJet administrator.

The NETJet is shipped with the protocols you ordered already activated. To enable others, you dial an 800 number to obtain a new Product Authorization Key (PAK) from Emulex. The new PAK can be applied through the RCF from any host terminal whose protocol is already supported. Upgrading to additional protocols is as simple as typing **change server key** from the RCF and entering the new PAK number.

The NETJet documentation is among the clearest and most concise I've seen but suffers from one shortcoming: A more detailed reference section is needed for the RCF commands. On the other hand, Emulex has one of the few publications departments that actually solicits reader comments. You may never need to use the RCF commands anyway, and I've found Emulex's technical support to be extremely prompt and helpful.

If you want to give your users direct access to network printers at equivalent jet-propelled speed, across multiple protocols, reserve them a seat on the NETJet. ■

```
 Current MIO Device Status
Identification:
   Product              LaserJet 4   MIO Revision    5.0

Status:
   Display              00 READY     Job:
   Printing:            no           Intervention:   ok
   Waiting for Data:    yes          Requires Paper: no
   Init:                no           Paper Out:      no
   Reset:               no           Paper Jam:      no
   I/O Chan Inactive:   no           Toner:          ok
   Memory Out:          ok           Door:           ok
   Page Punt:           ok

                                  22-May-1993 9:55:00
```

Figure 2: NETJet RCF Device Status Display

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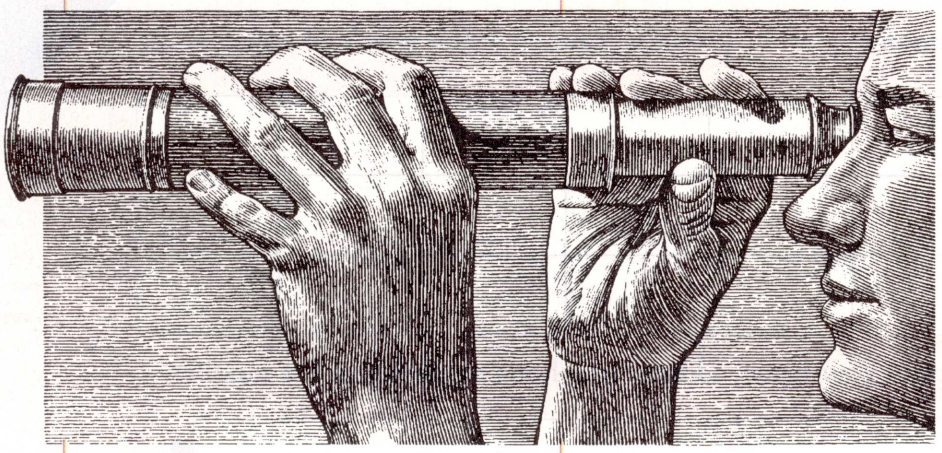

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PLATFORM:
HP 9000/7xx series

CIRCLE 304 ON READER CARD

Vantage Console Consolidator Monitors And Controls A Number Of Systems From A Single Point

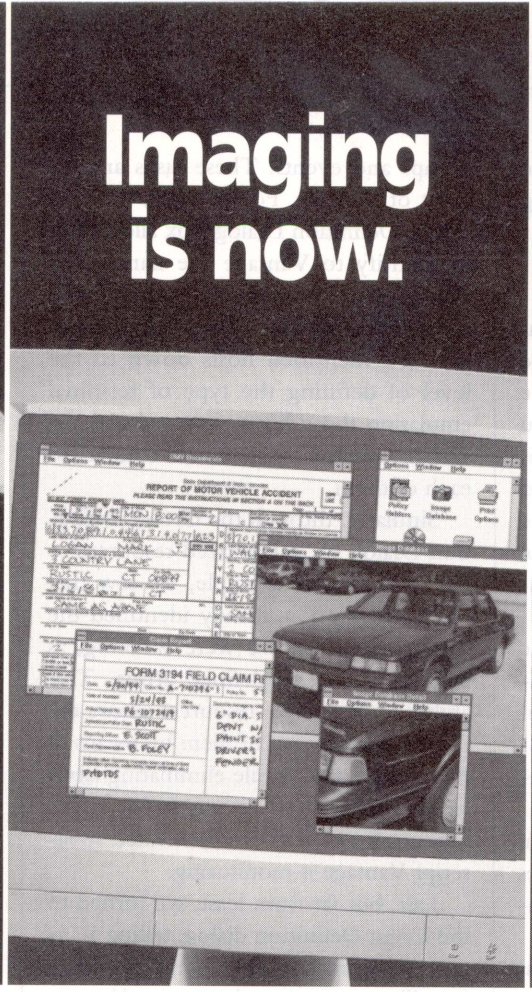
From navigation to watching a ball game, the vantage point makes the difference. To see situations as they develop in order to plan your course of action, based on an accurate assessment of the flow of circumstances, is the reward of a well-chosen vantage point.

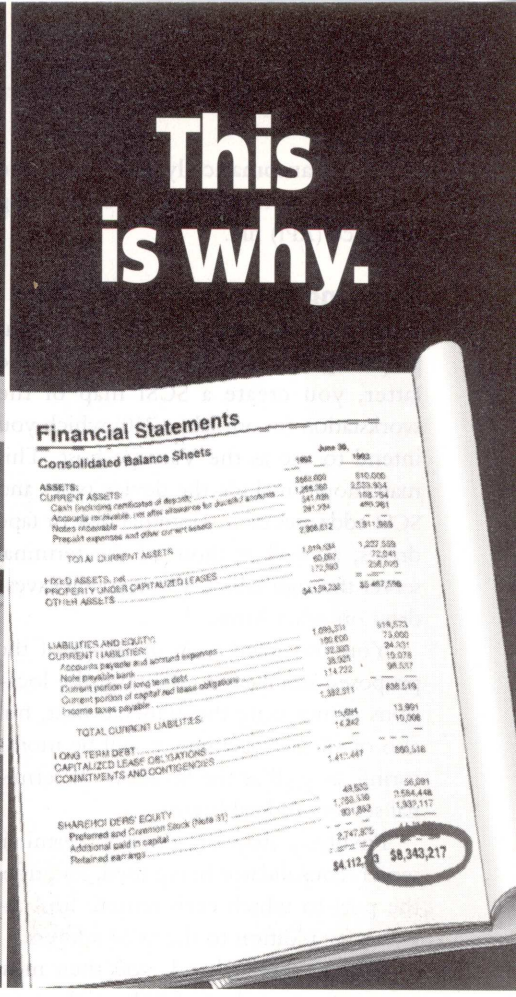
From the system administrator's point of view, such crows' nests have been limited to single hosts. That is, the most accurate report expected was an up-to-the-minute "snap-shot" of the status of one system. Likewise, network monitoring schemes are just as inflexible. While they are exceptional at eyeballing what happens between and among the stations in a distributed processing environment, traditional network monitoring schemes offer little ability to look at the microcosm — the activity within a member of a network.

Vantage v. 1.03 console consolidation and resource management system from Holland House (Austin, TX) promises a network with a view. Vantage, once connected to an HP 710 (running at least HP-UX 8.0) by means of a SCSI terminal server, listens in on the data streams associated with the console of those hosts. With host consoles active and functioning normally, Vantage sits quietly, sampling the various data streams and watching for user defined events to happen.

When such events are detected, Vantage reacts according to user defined parameters. Vantage makes several action responses, ranging from simply notifying an administrator that a particular event has taken

Michele Petrovsky





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place, to automatically executing the contents of an Applications Programming Interface (API) file.

Climbing Into The Crow's Nest

Installing Vantage isn't as demanding as preparing to install Vantage. To do the latter, you create a SCSI map of the workstation (in our lab, a 710) which you intend to use as the Vantage host. This map should include the device types and SCSI addresses of any internal disk or tape drives, as well as those of the terminal server through which Vantage will eavesdrop on other hosts.

You also need scale drawings of the proposed installation, showing the locations of not only the Vantage host, but also of all the machines it will be monitoring, as well as the locations of terminal servers and cable runs.

Finally, a map of the SCSI terminal server/consolidator being used, identifies the port to which each remote host attaches in addition to the SCSI address.

Having this in hand, you then must carry out a number of tasks such as set SCSI addresses, ensure the cable runs between members of Vantage's entourage don't exceed accepted distances and install the Vantage software. Installation requires HP-UX v. 8.07 and HP-VUE 2.01 commands.

Sounds like a lot, you say? Indeed it is, but understandably so for a product of Vantage's abilities. Take heart, however, the dealer commonly handles installations and configurations for customers, for an additional cost, quickly and efficiently.

On The Lookout

The first thing we encountered with Vantage was its Workspace Manager. This panel contains a clock, the current date, a calendar, a workspace switch which allows you to choose the work area displayed, along with performance graphs that give a real-time synopsis of resource utilization. The panel also provides HP related tools such as the Vuepad editor and access to E-mail.

Vantage's Administrative Functions menu allowed us to define resources, groups and events. These tasks are the heart of Vantage. For instance, the Resource Definition Dialog Box allowed us to identify to Vantage the names and characteristics of additional hosts whose console data streams we wished to monitor. We identified hosts down to the level of defining the type of terminal emulation those hosts expected and the way in which Vantage would connect to each of them.

Similarly, through the Group Definition Dialog we categorized resources to be watched. For example, we saw that our configuration already identified the 710, from which we were working, as belonging to a predefined group. This ability to group like resources allows the blanket monitoring of them by means of the group name, while eliminating laborious tasks such as asking to see every execution of every cron-activated shell-script Vantage is monitoring.

Last, but far from least, we turned to the Event Definition dialog, telling Vantage to look for the character string "pwd" on a monitored resource. Vantage defines an event as any character string that can appear on a monitored host's console. Within the Event Definition dialog is a window through which the desired responses to particular events are defined.

The basic responses include a message, a message with a request for a reply, a command to be executed on the host or group in question, a command file to be similarly executed, a report to be produced on a given printer upon the detection of a defined event, and a report whose constituent text is to be drawn from a specified file before being printed. Additional responses include the execution of an API with the ability to pass up to nine arguments to this user-written routine, and a Non-Event Display (NED) filter definition, which allows you to filter Vantage's default output to exclude those events with which you have no concern.

The NED filter definition itself allows for two responses. They are NED filtering with and without logging. The NED filtering with logging prevents the display of unimportant events on the NED window, but still stores them to a file so that no monitoring information is lost. The NED filtering without logging precludes displaying events judged moot, as well as foregoes their documentation to disk. From our vantage point, these responses performed as expected.

A Built-In Advantage

Having successfully navigated all the offerings of Vantage's Administration menu, we turned to its Operations menu. It is from this table of choices that the Broker program, Vantage's keystone, is activated. The Broker not only presents the NED window, but also carrys out event responses. Further, the broker must be run before Vantage's Monitor or Console processes.

The Monitor allows the enabling or disabling of event detection on defined resources. It reports on total and most recent characters read and events detected. The Console on the other hand is a fully-functional reproduction of the monitored resource's own, hard-wired console's display.

The Monitor and the Console are started from Vantage's Launch Control dialog. And they are more than just added bells and whistles. Only when this pair of processes is started for a given resource does that resource's nondefined event activity appear in the NED window. We tested all Vantage Operations Menu offerings without error.

Vantage is one of a suite of three resource management products supplied to us by Holland House. Vantage's two bundled partners are Uni-Spool, a product which creates a single print management environment for such dissimilar systems as PC servers and UNIX hosts, and Gen-Sys, an event-driven system mapping, monitoring and reporting tool. Both Uni-Spool and Gen-Sys were demonstrated to us, but were not included in this review.

Despite the complex nature of the product's mission Vantage is relatively simple to operate, because it is logially organized and presented. ■

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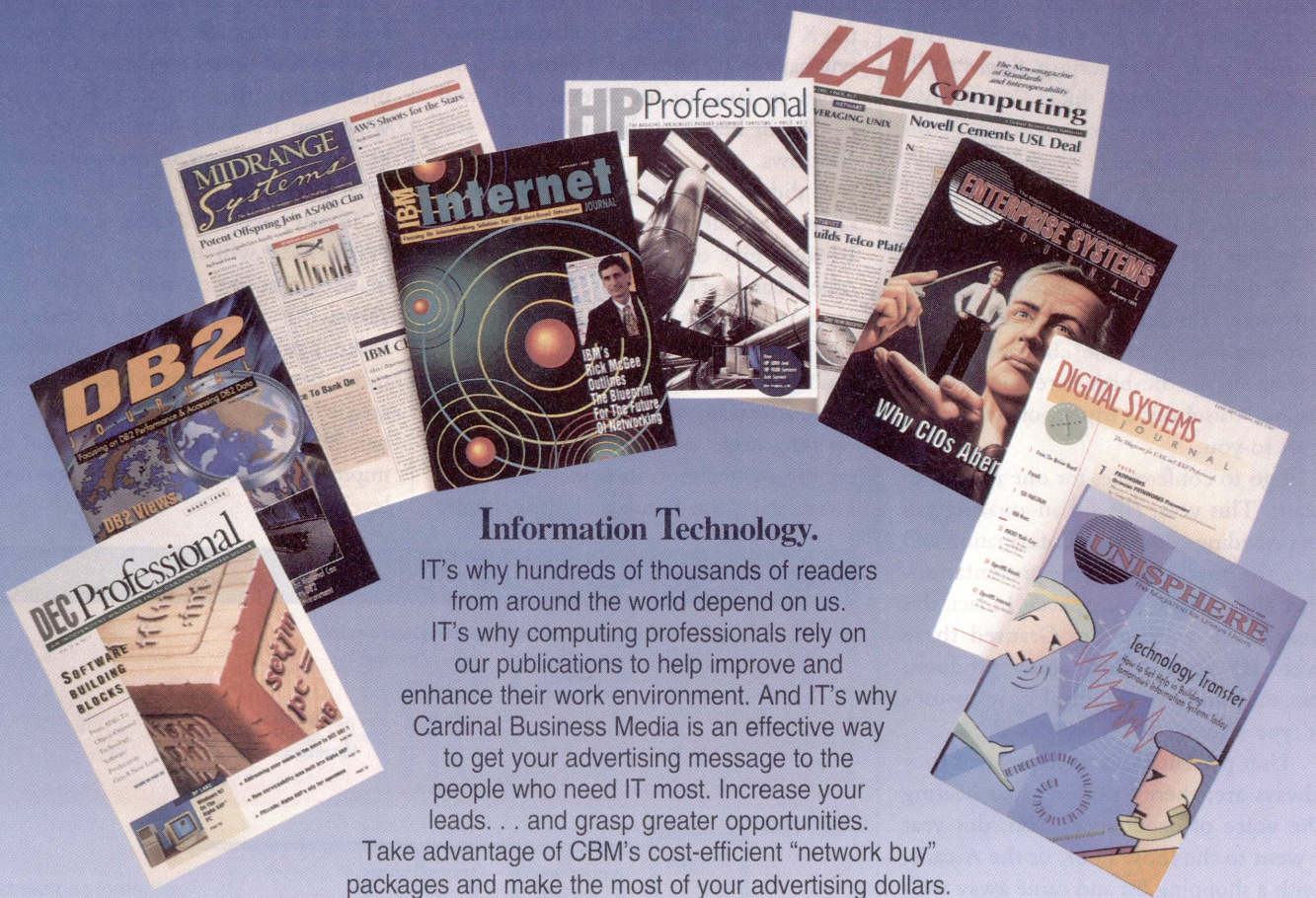

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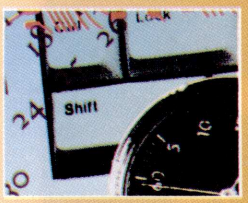

UNIX SYS_ADMIN

Fred Mallett

My Spring Break

When I announced plans to go to the InterWorks International Hewlett-Packard Workstation User Group Annual Conference this April, I took some serious flak. "April in Phoenix? Sounds like a vacation!" "Gonna get some free trinkets from the solution suppliers in the Arcade?" "Going for the free beer at the parties?" "Going to rub elbows with all the HP Workstation Group bigwigs?"

The answer to all the above is yes. But I suppose I should clarify that a bit. I have just returned from the conference; and because I am the boss here and there is no one to submit a trip report to, I'll report to you.

I go to conferences for one reason, to learn. This year, HP did an amazing job of providing educational information and not the marketing-hype presentations that often plague conferences. In fact, this year there were none. Granted there were HP presentations about products, but they were all technical how-to-use-it type sessions. I was impressed.

User presentations were great, as they always are; there's nothing like hearing the voice of experience. Also, this year I went to the show floor, or the Arcade, with a shopping list and came away with two good deals on products. I was impressed with some of the new technologies being displayed.

What I Learned

The conference started off with free tutorials on Sunday. The Windows NT Architecture session looked good. I learned that I don't have to worry about learning Windows NT for a while, because I don't believe it will be seen in an engineering workstation environment for a long time, if ever. That is not what Ted Demopolous of Demopolous Associates said; it's just what I derived from the information. NT does not support the X Window System, so all applications will have to be ported to Microsoft Windows to run, or an X emulator will be slid in between the application and windows.

I didn't get to sit in on the other choices of tutorials on Sunday, because I had to give one myself, but I had another chance at the X, sendmail and Shell script migration tutorials on Wednesday.

The opening session taught me that I can't join COSE, the new UNIX industry leaders agreement. Following the opening we let our hair down. If you can picture 400 technocrats talking shop, you know what the Sunday night welcome reception was like. And then Monday started two full days of presentations (8 a.m. to 6 p.m.), with all of us carrying around 30 pounds of proceedings books.

In the break-out sessions, I learned all kinds of things. Remember always to take notes of things you learn. Otherwise information flies so fast that much of what you learn on Monday you forget by Tuesday. I'll try to recount some of what I noted.

If you have a 2GB disk at 9.01, patch PHKL_2158 will improve disk performance. The patch notes say nothing about this performance increase, but Mike Lampi of MDL Inc. showed us some benchmarks proving a large increase in I/O data transfer rates. The benchmarks listed about 50 percent disk improvements from an already reasonable level.

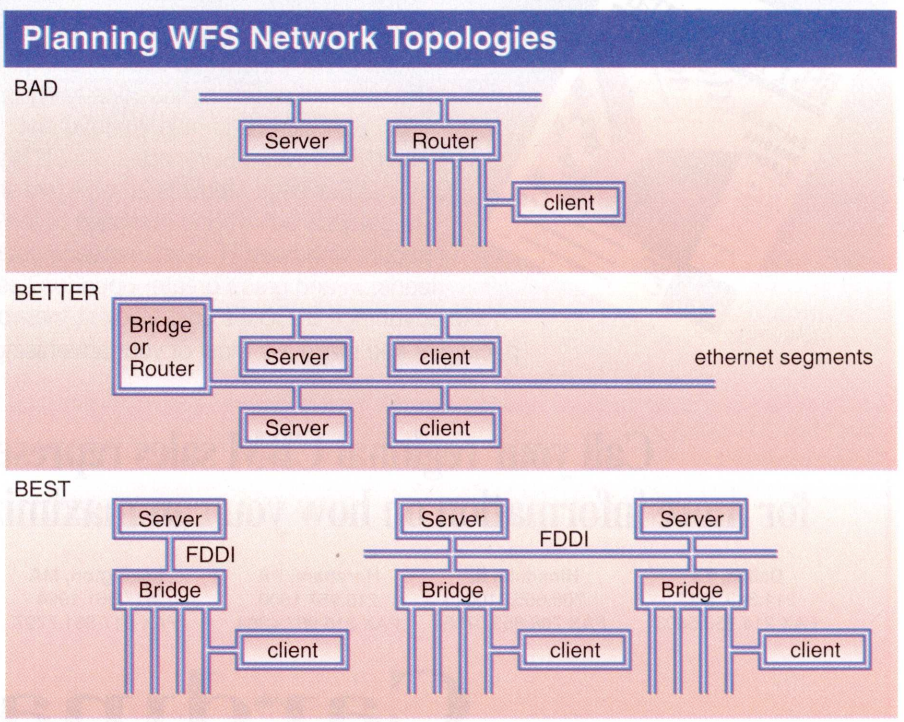

Figure 1: An example of improving NFS access performance with servers on the FDDI network, with bridges to the clients.

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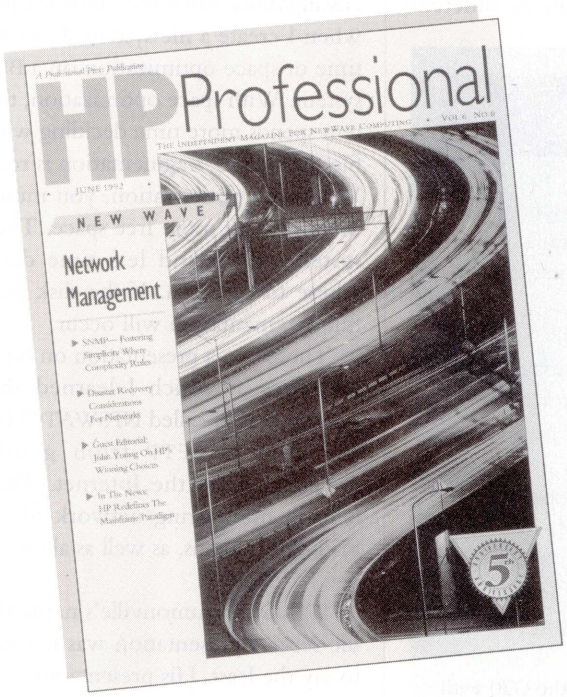

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This presentation pointed out that changing the NS and NT parameters when you "mkfs" a disk can increase disk I/O data rates. Some of the combinations listed in the displayed charts of possible combinations of the NS (number of sectors per track) and NT (number of tracks per cylinder) gave huge performance increases over others. However there is no general set of combinations; the higher performance combinations of values differed disk model to disk model.

Don't laugh. With the controller onboard the drive in SCSI drives, you can lie about the disk geometry when creating the file system. This causes the operating system to send data in different amounts, which affects the performance. Remember, you can't just look for the highest performance. You must remember the trade-off. If you set up for few tracks and cylinders, you lose file size granularity and can end up with more waste, and if you don't compensate, you can fill the inode table. The amusing part is that most documentation says never to change these two parameters, yet here are the benchmarks to prove the cost savings inherent in improved system performance.

The lab is the place to get technical questions answered by experts.

While I was wandering around discussing disks, someone informed me that when I create a file system, I can specify time or space optimization on a BSD file system. With space optimization, the system spends more time deciding where to file files. Thus, fragmentation is reduced. With time optimization, you must keep the disk with more free space. Then the system will spend less time deciding where to put data. If the disk gets too full, fragmentation will occur.

There was a presentation on NFS performance at which I learned about a scareware tool called NFSWATCH that is available via FTP from gatekeeper.dec.com. on the Internet. This will help in monitoring network file server loading problems, as well as allow you to get TCPDUMP.

HP's Steve Jumonville's networks and file servers presentation was informative to say the least. His presentation covered various methods of configuring a network environment for optimum performance. Even a summary of all the information covered would take pages, but here are a few tidbits that stick in my mind. For a network with X terminals, the benchmarks showed a noticeable performance drop if the Ethernet exceeded 25 percent loading. NFS servers should conform to the list below.

Guidelines for optimizing disk I/O performance on an NFS server:

- Maximum five disks per single-ended SCSI channel.
- Maximum 10 disks per fast-wide SCSI channel.
- Setup for SCSI-2 if supported by the system.

A Strong Family Grows

PALO ALTO, Calif. — HP announced six new UNIX-based HP 9000 Series 800 business servers. Doug Gibson, HP 9000 Product Manager defines the new systems as, "Helping with two strategic thrusts at HP — providing an alternative to mainframes and delivering a client server environment."

Three of the new deskside servers — the HP 9000 Series 800 Models G60, H60 and I60 — use HP's 96-MHz PA-7100 processor, extending performance by 40 percent. The Models G70, H70 and I70 use dual PA-7100 processors in a symmetrical multiprocessing configuration which HP maintains increases the family's current performance by more than 100 percent.

"This is a case where HP practices, not preaches," says Gibson. With the new systems, expected to be available next month, HP plans to provide a scaleable offering of standards based computers. The new 60 Model uniprocessor systems cost: $50,000 for the Model G60 with 32MB of memory, 500MB of disk storage and four HP-PB I/O slots; $83,000 for the H60 with 64MB memory, 1GB disk and eight slots; and $108,000 for the I60 including 64MB memory, 4GB disk and 12 slots

The Model 70 twin-CPU symmetric multiprocessors cost: $76,000 for the G70 with 32MB memory, 500MB disk and four I/O slots; $109,000 for the H70 with 64MB memory, 1GB disk and eight slots; and $129,000 for the I70 with 64MB memory, 4GB disk and 12 slots.

According to Gibson, the Model H70 performed at 411.73 transactions per second in the TPC-A performance benchmark. He says these speeds allow the new systems to target both batch- and OLTP-environments.

Series 800 customers increase performance by simply changing processor boards, backplanes or chassis. The pre-installed and pre-configured HP-UX operating systems on all new models are fully compatible with the existing HP 9000 family of servers and workstations running HP-UX (2) operating systems.

In addition to the new systems, HP announced price reductions from 10 to 30 percent across the rest of its entry-level and midrange series 800 business servers. "HP is acting like a leader. We now focus in on why a customer buys a computer and provide the overall solution," concludes Gibson.

- Spread data across disks to equalize disk and channel loading.
- Two 1 GB disks give better performance than one 2 GB disk if the data accesses from each equally.
- Be sure the disk subsystem is up to the speed of the NFS server.

Also covered was how to determine the NFS file system performance needed, depending on the use of the network. This help determine what size NFS servers to buy. Not surprisingly, the best NFS access performance was had in the study from a network structured as in *Figure 1*, with the servers on the FDDI network and using bridges to the client segments. The network architecture also gives a good growth path to future network technologies. Steve's paper is available from InterWorks by buying the conference proceedings book (page 387 of Volume 1). An interesting recommendation here was to configure all DNS clients as DNS cache-only servers, to minimize network traffic.

The sessions on configuring and performance tuning of HP VUE — a total of five hours worth — were great. The technical lab was better than ever this year. Every question I arrived with was answered by the attending experts. I also got a chance to play with several HP products before thinking about buying them. I didn't have time to go through the whole technical lab procedure book, but after I returned to the office I used it as a tutorial. This booklet is developed by HP technicians to guide you through using and configuring products such as NFS, NIS, Mpower, converting shell scripts — the list goes on!

The technical lab is an area where HP sets up a network showing off all the latest products and versions. The best part is that we get to play with it all. It is a great way to try before you buy, as well as being the place to get specific technical questions answered by experts on the subject.

I have decided that if everyone starts spending their training budget by sending people to the InterWorks conference and doing the Tech Lab procedures, I'm going to have to put up the Going out of Business sign. Know anyone who needs a brand new DAT tape drive?

All told, there were 72 hours of presentations, 24 hours of tutorials, 7 hours of general sessions, 25 hours of Tech Lab, 25 hours of Arcade, 25 hours of HP Q&A desks, and 4 hours of parties. For my money, this is the best value in training dollars in the industry.

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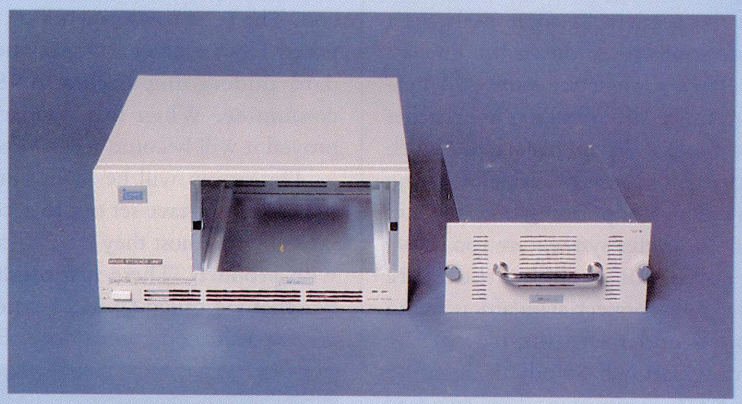

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NETWORKING

Tim Cahoon

See The Light

Anyone who administers a computer system knows the Theory of Constraints first hand. That being: One part of your system inevitably prevents everything else from functioning at their highest potential. Once you fix the bottleneck, there is always a new one somewhere down the line. In today's environment we now add networks to this puzzle resulting in branches of bottlenecks. With high bandwidth networks commonly available, it is the network which is pointing out the fact that our computer systems are too slow!

To solve this problem the Fibre Channel interconnect standard is being developed under the auspices of the American National Standards Institute (ANSI) X3T9 committee. This standard will define a fiber based method of connecting workstations, peripherals, mainframes and networks in a distributed fashion; a method in which only the pipe is changed, not the protocols.

An example could be the HP 2GB SCSI disk drive for the HP 9000s. Today it connects to the system via copper wires which carry the SCSI protocols to access data. Fibre Channel keeps the SCSI protocols intact; while the data runs on fiber cables which have a magnitude higher bandwidth and less restrictive distance limitations.

The Fibre Channel specifications call for a bandwidth range from 133MB per second to over 4GB per second. This range allows for a series of scaleable products to be developed to meet various needs and cost considerations. Less expensive products for low bandwidth requirements are possible along with higher cost products that mix video, data and voice using gigabytes of bandwidth.

To jump start this new technology HP, IBM and Sun Microsystems have joined together to form the Fibre Channel Systems Initiative (FCSI). This group is a joint effort to advance Fibre Channel as an affordable, high-speed interconnections standard for workstations and peripherals. The goal is to make the standard open, and the hardware low cost. The FCSI bases its work on the proposed Fibre Channel interconnect standard undergoing review ANSI X3T9 committee. When this standard is approved it will become an ISO document.

This group will be plenty busy with the tasks they have set out to accomplish. First and foremost they have to come out with products. These first products will be what are called CLASS 1 types which are for dedicated connections. Examples of this would be peripheral connections for devices such as disk drives. As higher bandwidth products are released expect them to support high bandwidth applications such a imaging, voice, video and medical. You may see FCS switches that connect FCS routers, disk arrays, workstations with FCS cards, Mainframe connections, high speed printers, medical equipment and factory devices into one large distributed network. It is here that we will have gigabytes of data flowing through the network every second.

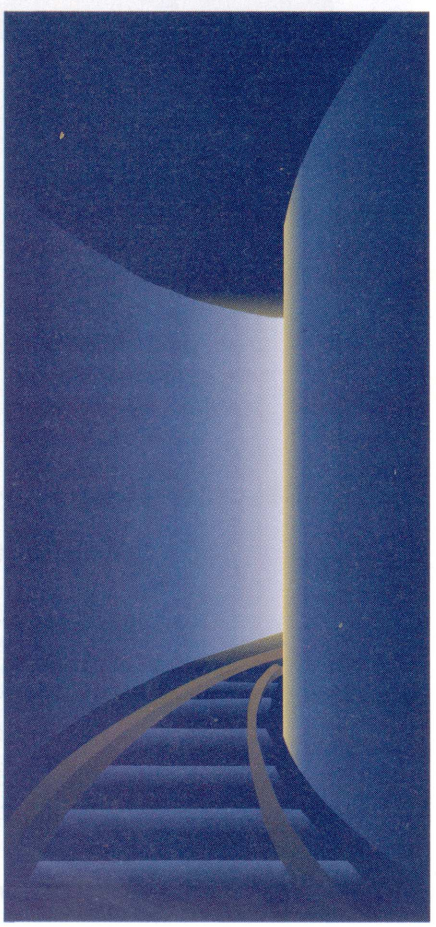

Illustration by Jack Rotoli

Second, they have to educate us, the users, on what Fibre Channel is and how it will benefit us. As consumers we need to know what constitutes the best use and investment of devices which feature the Fibre Channel interconnect system. We need to understand its purpose so that we can justify its purchase.

Last, and most important, they have to make sure that interoperability truly exists. To do this profiles are being created that define each specification. It is these profiles which will be the key to interoperability.

In addition, the group is working toward a common third-party testing program and they wish to foster independent testing efforts. Of all the tasks, this one has to be the hardest. We certainly don't need another standard like SCSI where it seems a hundred different flavors exist.

Lawrence Livermore Laboratories is currently serving as a test bed for this new technology. Exactly what they are testing has not been released as of when this column was written. I was told, however, that in the September time frame the details will be made public.

Tim's Tip of the Month

Working this past nine months on a HP 9000 Series 817 running HP-UX has been

an exciting experience. I have been able to expand my networking knowledge base and have fun doing it. Lately though we have been plagued with some problems which could have proved detrimental to our LAN if not for an observant system administrator and a quickly growing syslog file.

A syslog file (/usr/adm/syslog) on a unix box is the combination of the system log file (LOG####.PUB.SYS) and network log file (NMLG####.PUB.SYS) on an HP 3000. This file records the good, the bad and the ugly things that are happening to your system.

One day we noticed that our syslog file had grown unusually large, in fact it was still growing. Investigation showed that the systems bootp daemon was trying to respond to requests that were coming in every five seconds. Two lines are written for every request. One was for the request itself showing the ethernet MAC address and the other for not being able to fulfill it.

Bootp is a method used by a device to automatically download its operating system or parameters from a host on the network. In this case we discovered that it was our newer Synoptics concentrators under network management that were the culprits. These new models use bootp to get their network management parameters when they are powered off. The solution here was to make sure the Synoptics network management workstation was always on and that bootp was left running.

The second time this happened it was with one of the new HP LaserJet printers with all the network connections. It has a default setup to support UNIX printing. If you are not going to use it with UNIX systems, make sure you disable that feature. If you don't, then every five minutes it will issue a bootp request across your network. That's 24 lines in your syslog file an hour, 576 lines per day or 4032 lines per week, and a whole lot per month.

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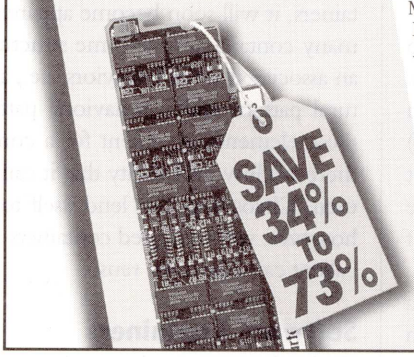

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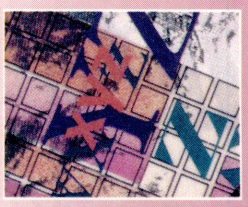

OBJECTIVELY SPEAKING

Richard Riehle

Templates Offer Viable Option When Software Reliability Is The No. 1 Goal

Reuseable Containers

Fill a paper cup with jellybeans. Eat the jellybeans. Now, fill the same cup with peanuts. That's reuse in action. The paper cup is a container, and in software development, containers are the easiest components to reuse.

One problem with my paper cup container is the chaos of the contents. My jellybeans are not organized so I can easily devour all the black (my favorite) and leave the purple (ugh!) for the next unfortunate person. This means that we need a container with some kind of structural pattern.

An example of a container with a structural pattern is an egg carton. Each egg may have its own slot. The structure is bound to a set number of possible slots. An egg carton accommodates 12 eggs. The abstract structural pattern is that of a 2-D matrix. I can use the egg carton container for chicken, duck or quail eggs. I can even use it for jellybeans. The structural pattern of the egg carton will not change when I use it for something other than its original purpose.

Besides structural pattern, a container also may have an explicit or implied behavioral pattern. In computer science, we call a pattern of behavior an algorithm. Some algorithms are designed as functions; others are procedures. A procedure algorithm will be the method by which we modify the contents of the container. A function algorithm returns information about the container.

Most containers require a set of algorithms rather than just one algorithm. For example, there may be one procedural algorithm to increase the number of elements in the container and another to remove an element. I might want to put all black jellybeans in one location in the egg carton, and each other color in its own location. Later, I will use another procedure for eating from the black group as I please while ignoring the purple group. A function algorithm will tell me whether the container is full, empty, or how many cells are occupied.

If you consider other real-world containers, it will soon become apparent that many containers have some structure and an associated set of behaviors; i.e., a structural pattern and a behavioral pattern. If these elements are absent for a container, there is a low probability that it can be reused. Chaos does not lend itself to reuse, however, well-designed containers are excellent candidates for reuse.

Software Containers

To implement container reuse, we design container templates. A template can take the form of a object class or a generic component. In C++, the word template is a keyword to support the notion of a "container class." In Ada, a template is implemented using a generic component.

One important feature of a well-designed container is its adaptability to contain more than one kind of thing. Ideally, the container can be used to store data of any type, including other containers. In addition, the behavior associated with the container is predictable — we can depend on it.

The simplest containers in software are the composite types such as arrays and records. In their general form, such types can be designed to store any kind of components. We can even have an array of records or a record containing other records or arrays.

Some software containers are more sophisticated. Volatile data structures such as trees, lists, queues, deques, maps, graphs, stacks and matrices, and persistent data structures, such as files, are in this category. This is where we get our most important benefits from container templates. It is also where we depart from simple ideas such as paper cups and egg cartons and concern ourselves with logical versus physical patterns.

A Sample Software Container

Suppose we have the notion of a container that is logically organized as a 2-D matrix. Its logical pattern is easy to understand, and the algorithms for its management are well-understood. Now suppose the logical size of each dimension of this matrix can be 1 million cells but the matrix never will be more than 25 percent full. This is called a sparse matrix. Algorithms exist to ensure that such a matrix will logically represent a million by a million cells but physically take only 25 percent of that space. Otherwise, we might not be able to represent such a matrix on our system. Such matrices often are used in designing spreadsheet programs under the assumption that an actual spreadsheet rarely uses all the logically available cells.

If we now generalize that sparse matrix so we can set the logical limit, we can develop a generic specification, using Ada, that might look like this:

```
generic
        Max_Length : Long_Integer;
        Max_Width  : Long_Integer;
        Limit  : Long_Float;
        type Component  is private;    - the type of
data
                    - in the matrix
package Sparse_Matrix_Manager is
        type Sparse_Matrix is ...;
        procedure Insert  ...
        procedure Delete ...
        procedure Retrieve ...
private
        type Sparse_Matrix ...
           - additional definition of Sparse_Matrix
end Sparse_Matrix_Manager;
```

The parameters in the generic part of this specification permit the user to define a Sparse Matrix of any logical size. Consequently, the package is only a template for a matrix object. To create an actual object for managing a sparse matrix, the programmer needs to create an actual instance of the template with a new name. Creating an instance of a template with a new name is called, "instantiation."

Here is a simple record definition for our matrix:

```
type Star is record
          Name    : String (1..30);
          Lumens : Long_Float;
          -- additional data definition
end record;
```

Here is the instantiation:

```
      package Star_Manager is new
Sparse_Matrix_Manager
                (Max_Length => 1_000_000,
                 Max_Width  => 1_000_000,
                 Limit              => 25.0,
                 Component  =>  Star);

(The symbol, =>,  is read, "becomes").
```

We now have a new object, Star_Manager. It is a container object that can contain objects of type Star. We can rely on its behavior, and we can understand its logical structure. In this case, the logical structure may be totally different from physical structure. We have instantiated it so it never will be more than 25 percent full.

Leveraging Versus Reuse

Container objects continually appear in the world of software development. The traditional practice has been to design each container as a unique component because most programming languages fail to adequately support the notion of "instantiation." For example, COBOL, C and PASCAL have no support for this mechanism. New languages such as Ada, C++ and Eiffel have intrinsic capability for such templates. Consequently, it's difficult to implement a true "reuse policy" with C or COBOL. Instead, we have "software leveraging."

With software leveraging, the programmer realizes that a container required for one solution is just like the container used for a previous project, except for the definition of the contents. It's a simple matter to retrieve the code from a library, import it into the new program, and do a global replace on appropriate data items. With a language such as COBOL this is particularly dangerous because of the potential side-affects in the global data. With C, as it is generally written, this method can be equally dangerous. Also, I rarely have met a programmer who can resist the temptation to make "just one little change" to the existing module during the leveraging process.

The difference is that reuse does not require programming change to the container; software leveraging involves some code changes. Whenever we change the code, there is the potential for introducing new errors. Anyone who has instantiated a generic (template) sort program into an actual sort program has experienced this notion of software reuse.

When you build software applications that require containers, consider how you can generalize those containers so you can reuse them with instantiation. If you must use the "leveraging" method, establish guidelines to reduce the potential for errors. Also, for Ada and C++ you can actually buy reusable container templates in the marketplace. Sometimes purchasing such containers is a good choice for an application when software reliability is the No. 1 goal.

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CGI To Regenerate Legacy Applications

CGI Systems Inc. introduced a proprietary client-server regeneration service for those mainframe applications that were created using the PACBASE family of CASE tools.

The new CGI service, which will enable PACBASE customers worldwide to distribute mainframe applications over popular mid-range, UNIX and LAN hardware platforms, uses CGI-developed macro programs for automatically splitting applications into their client and server components.

CGI also uses development tools from Micro Focus to create both the necessary communications links between the two portions of the application and to create the graphical user interface.

Contact CGI Systems Inc., One Blue Hill Plaza, P.O. Box 1645, Pearl River, NY 10965; (914) 735-2231.

Circle 400 on reader card

HP's Optical Disk Jukebox

HP Offers Optical Jukebox Storage Solution

HP announced the HP Optical Jukebox Storage Solution, an optical-disk library storage system designed to extend hard-disk storage on a PC-network server running Novell NetWare by up to 10.4 GB. HP will market this optical solution through resellers.

The company also announced a 5.25-inch multifunction optical disk drive that offers 1.3 GB of storage capacity on a single disk.

The HP Optical Jukebox Storage Solution is designed to provide PC-network users who need high-capacity storage with continuous free disk space by enabling large files to be stored offline while also keeping those files easily accessible.

The HP Optical Jukebox Storage Solution consists of the HP MZNodel 10LC optical jukebox and interface kit. The Model 10LC contains a high-performance 5.25-inch optical-disk drive that supports both re-writable and write-once operations. It has a 16 optical-disk cartridge capacity.

The new Model C1716T doubles the storage capacity of 5.25-inch optical disk drives, thereby reducing the cost per megabyte. The drive uses European Computer Manufacturing Association media standards which increase capacity through zone-bit recording techniques, increases linear recording density and decreased track spacing.

Targeted for OEMs, the Model C1716T is suitable for imaging, CAD, near-line storage and other applications that involve large files. In addition, the 1.3-GB optical drive is jukebox ready and HP plans to integrate the unit in its line of optical disk libraries. HP also plans to provide disk drive upgrades to its installed base of jukebox customers so they can double the storage capacity of their jukeboxes.

MacTCP Connects To 3000, 9000 Hosts

Unison-Tymlabs released Version 4.12 of Business Session for the Macintosh, offering MacTCP connection to HP 3000, HP 9000 and DEC hosts.

MacTCP is Apple's standard for communications between Macintoshes and host systems over TCP/IP-based local area networks. With the addition of support for MacTCP, Session now operates in harmony with all Mac-based applications that conform to the Apple standard for LAN communication. This means that users can run Session in one window and a database access program in another. As long as both support MacTCP, each can access the host as needed without conflict.

Contact Unison-Tymlabs, 811 Barton Springs Rd., Austin, TX 78704; (512) 478-0611.

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Logicraft Announces Windows NT Servers

Logicraft announced Microsoft Windows NT support for its Omni-Ware network servers. Omni-Ware lets users of UNIX workstations and minicomputers run Intel-based operating systems, including OS/2, MS-DOS and MS-Windows, concurrently with their UNIX-based operating system.

Omni-Ware can be configured with Intel 80486 or Pentium CPUs. The Omni-Ware NT server can be connected to the UNIX host via Ethernet or SCSI.

Contact Logicraft Inc., 22 Cotton Rd., Nashua, NH 03063; (603) 880-0300.

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Box Hill Introduces Tape Box

Box Hill Systems Corp. introduced the Tape Box, a dedicated network server for tape drives and media changers, designed exclusively for UNIX network backup.

The Tape Box makes device drivers for tape drives and media changers virtually obsolete. Data is sent directly from any workstation on a network to the Tape Box, which writes any tape format specified to a tape device.

The Tape Box can increase the Backup System's efficiency; multivendor backups will be simplified, centralized and based on standard TCP/IP protocols. The Tape Box eliminates the need to add device drivers into a kernel whenever a new revision of an operating system is released, or a new tape drive or media changer is added.

Contact Box Hill Systems Corp., 1651 Avenue of the Americas, New York, NY 10013; (212) 989-HILL; (800) 727-3863.

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HP Offers Advanced DeskJets

Hewlett-Packard introduced the HP DeskJet 1200C and 1200C/PS printers. They are the first printers to bridge the price/performance gap between office-printer functionality and full-color graphics capabilities. Priced at $1,699 and $2,399 respectively, they are comparable in price to many office laser printers and less than half the price of most high-quality color printers.

The printers produce text at up to seven pages per minute (ppm) and offer 600 by 300 dpi text print quality. They are optimized for plain paper and create 300 by 300-dpi full-page color business graphics with true black at speeds up to 1 ppm for a small fraction of what it costs to print color documents on most other printers.

The HP DeskJet 1200C/PS printer includes PCL 5 and PostScript Level 2 software from Adobe, with a LocalTalk interface and automatic language and interface switching for use in Macintosh and mixed computing environments.

Cadre Introduces ObjectTeam

Cadre Technologies Inc. announced ObjectTeam, a suite of advanced object-oriented software development tools and services.

These tools deliver automation of both the Rumbaugh et al, Object Modeling Technique (OMT) and Shlaer-Mellor methodology for object-oriented analysis and design. In addition, ObjectTeam generates C++, Ada and SQL code and supports many object-oriented and relational databases.

ObjectTeam products support an open tool architecture and are easily integrated with popular object-oriented programming environments and other development tools such as configuration management systems. ObjectTeam solutions run on UNIX- and VMS-based workstations and PCs running Microsoft Windows.

List Prices for ObjectTeam products start at $3,995 and vary depending on configuration.

Contact Cadre Technologies Inc., 222 Richmond St., Providence, RI 02903; (401) 351-5950.

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Magic Software Unveils MAGIC 5.0

Magic Software Enterprises Inc. introduced MAGIC 5.0, a new development environment based on a code-free methodology allowing rapid implementation of complex business applications across heterogeneous platforms.

A strategic front-end tool that allows developers to design, prototype, test and modify applications in one step, MAGIC 5.0 is designed to dramatically boost productivity rates over traditional programming methods. In MAGIC, applications are programmed by description and logic, eliminating the need for writing code.

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$800. LAN development licenses are $1,500. Other prices vary depending on platform, hardware configuration and number of users.
Contact Magic Software Enterprises Inc., 1200 Main St., Irvine, CA 92714; (714) 250-1718.

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CA-UNICENTER/125 For HP Workstations

Computer Associates announced it will make CA-UNICENTER/125, an integrated systems management solution for UNIX-based workstations, available on HP's PA-RISC workstations.

The HP Apollo 9000 Series 700 workstations family is the first workstation family for which CA is making its CA-UNICENTER/125 product available.

CA-UNICENTER/125 enhances security, improves file management procedures and automates workstation activities. When working in conjunction with CA-UNICENTER/325, CA-UNICENTER/125 offers complete enterprise-wide integrated systems management.
Contact Computer Associates International Inc., One Computer Associates Plaza, Islandia, NY 11788-7000; (516) 342-5224.

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DECADE-UX 2.0 Features New Character Generator

Cadshare Resources Inc. released DECADE-UX 2.02, giving users the ability to customize DECADE-UX using a powerful macro language.

The DECADE-UX macros language provides a quick and easy method of executing a sequence of commands automatically with little or no user input. The macros programs can use all of DECADE-UX's drafting, grouping and database functions and can incorporate arithmetic, algebraic and trigonometric functions.

Everything needed by an application developer is featured in the macros language including debugging aids, on-line macros editing and integration in the user interface.

Version 2.02 also features a new character generator that supports a variety of fonts, DECADE-UX include the full set of Hershey character fonts plus a font editor, allowing you to customize your own fonts.

DECADE-UX is priced at $995 and is supported on system 5 UNIX-based hardware platforms including all RISC workstations.
Contact Cadshare Resources Inc., 9303-N Monroe Rd., P.O. Box 11859, Charlotte, NC 28220-1859; (800) 633-7644.

Circle 393 on reader card

INSIGHT Isolates Memory Problems

ParaSoft Corp. announced the INSIGHT Tool Set for programmers writing in Fortran or C. The INSIGHT Tool Set saves time, reduces cost and improves overall program reliability.

INSIGHT helps programmers by automatically isolating a variety of memory problems and detecting algorithm anomalies through its intuitive graphical interface.

The INSIGHT automatic Debugger and Algorithm Validation Tool Set is applied in a two-step process. INSIGHT's BUGS module first uncovers memory problems such as wild pointers, out of bounds memory references and memory allocation errors. Next, the VTOOL module displays access patterns of arrays, and more.

INSIGHT is priced from $995 per language.
Contact ParaSoft Corp., 2500 E. Foothill Blvd., Ste. 205, Pasadena, CA 91107; (818) 792-9941.

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Natural Construct, Predict Available For UNIX

SOFTWARE AG announced its production-scale application engineering tools for the UNIX platform. NATURAL CONSTRUCT and PREDICT for UNIX enable users to maintain either central or departmental control while distributing application development anywhere from the mainframe to the desktop, to reduce costs and ensure data consistency across the enterprise.

NATURAL CONSTRUCT and PREDICT for UNIX are targeted toward organizations that need industrial-strength tools to develop complex, mission-critical applications in a multiplatform environment.

NATURAL CONSTRUCT, a model-based application generator, enables rapid application development (RAD) and ease in prototyping of applications. A comprehensive library of models delivered with NATURAL CONSTRUCT enables users to be immediately productive.

PREDICT is an integrated active data dictionary. It documents and supports the technical design, implementation and maintenance of both databases and applications.

Prices range from $600 to $34,000 depending on configuration.
Contact Software AG, 11190 Sunrise Valley Dr., Reston, VA 22091; (703) 391-6731.

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SoftBench Tool Simplifies Software Task Automation

Hewlett-Packard introduced the SoftBench Message Connector, which allows software developers to define the interactions among software tools in a matter of minutes without writing code.

SoftBench Message Connector enables software developers to benefit more completely from development tools integrated in a common framework. In the past, the development tools communicated only as specified by the tool supplier. Now, through a simple menu interface, developers can change their tool environment as often as necessary to support new work assignments or automate new tasks that involve more than one software tool. Developers can easily create or change their software environment to match their workstyle.

The SoftBench Message Connector is bundled with the SoftBench Framework and is $495 per copy.

ARSAP For UNIX Provides System Accounting

GEJAC Inc. announced the commercial release of the ARSAP Resource Management and Chargeback software for all HP 9000 systems running HP-UX and Apollo Domain Systems.

ARSAP provides the systems administrator with data to account for the use of system resources by user, project, section or department, on any multiuser system or workstation.

With one Reporting module for the administrator, and Data Collection modules on each node or workstation being monitored, ARSAP tracks ucpu, scpu, bio, cio, connect time, seat time, logins and other system resources. It can identify which software packages are being used, how often, on which nodes, and by whom. ARSAP also reports the system resources used by individual software applications to determine their impact on the overall system.

Contact GEJAC Inc., 8643 Cherry Ln., Laurel, MD 20707-6210; (301) 725-2500.

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INTERSOLV Delivers New Functionality

INTERSOLV Inc. enhanced its Desktop Development Product Family to increase the ability of INTERSOLV users to integrate, customize and use desktop development tools for heterogeneous client-server environments.

INTERSOLV's PVCS software Configuration Management solution has been integrated with the HP 9000 RISC platform. This increases the ability of PVCS users to manage software configurations in heterogeneous environments. Additional platform support for PVCS users includes Solaris, AIX, SCO, DOS, Windows and OS/2.

Contact INTERSOLV, 3200 Tower Oaks Blvd., Rockville, MD 20852; (301) 230-3200.

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VMEbus Computer Bundled With HP-UX

Hewlett-Packard introduced its VMEbus board-level computer, the HP 9000 Model 742i.

The new computer is based on HP's PA-7100 technology and expands HP's family of industrial computers. It is bundled with the industry-standard HP-UX operating system, which provides users with access to more than 3,600 applications.

The Model 742i is designed for system integrators and OEMs in manufacturing, aerospace and defense, and incorporates the 50-MHz PA-7100 microprocessor, which delivers performance of up to 61 MIPS.

The Model 742i includes the PA-7100 50-MHz processor, 16 MB of main memory and expansion options of 32 MB and 64 MB of memory, and on-board LAN connector. It also includes an HP parallel port (Centronics), two RS-232C ports and a SCSI-2 SE port. Prices begin at $8,795.

Uniface Expands ALLBASE/SQL Support

Uniface announced it has developed new interface drivers that transparently link the UNIFACE 4GL to HP database management systems (DBMS).

The new UNIFACE ALLBASE/SQL U2.0 Interface Driver supports the advanced feature of ALLBASE/SQL, including long datatypes of variable length that can be stored in their binary format, such as graphics, images or voice; ability to connect to multiple environments simultaneously and multi-transaction mode that allows multiple transactions to be active across currently connected database environments.

Also included are row-level locking to improve concurrency control when multiple

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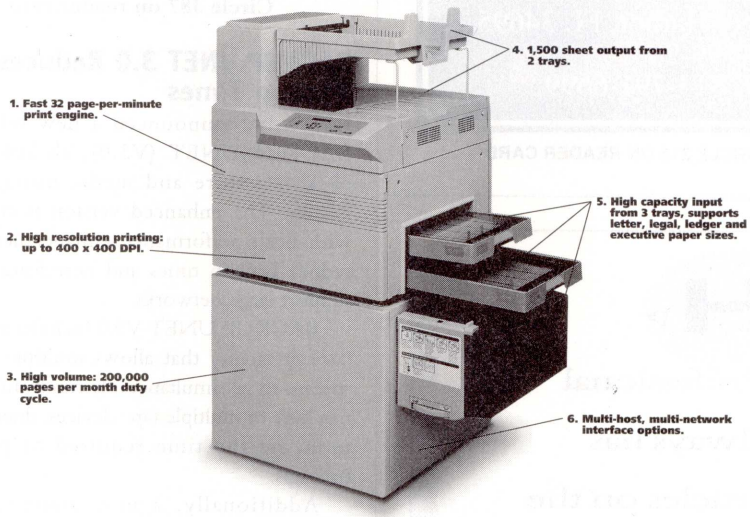

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users are accessing a table in a database; lock timeouts for avoiding indefinite delays when a resource request is blocked; and dynamic space expansion that transparently expands files if an overflow occurs, eliminating the need to bring down the database to increase file space.

The UNIFACE ALLBASE/SQL U2.0 Interface Driver will support ALLBASE F.0 on HP 3000 Series 900 systems running MPE/iX 4.X releases. It also supports the HP 9000 Series 700 and 800 systems running HP-UX 8.0 and 9.0 releases.

The UNIFACE IMAGE/SQL U2.0 Interface Driver will support IMAGE/SQL on HP 3000 MPE/iX 4.X releases running on HP 3000 Series 900.

Contact Uniface Corp., 3120 Harbor Bay Pkwy., Ste. 100, Alameda, CA 94501-6556; (800) 365-3608.

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BACKUP.UNET 3.0 Reduces Backup Times

Raxco Inc. announced a new release of BACKUP.UNET (V3.0), an automated backup/restore and media management system. The enhanced version is equipped with both performance enhancements that reduce backup times and new features that support large networks.

BACKUP.UNET V3.0 includes a parallel backup facility that allows multiple backup streams to be simultaneously run from a single machine to multiple tape devices, dramatically reducing the time required to perform backups.

Additionally, a new graphical user interface (based on OSF/Motif) improves ease of use and provides online help capabilities; a scheduling feature allows users to define a schedule or select the individual dates to run backups; and a network installation feature allows users to configure their backup system from a central location.

Contact Raxco Inc., 2440 Research Blvd., Rockville, MD 20850; (301) 258-2620.

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DDS/Patrol Available On HP 9000

Patrol Software Inc. announced the general availability of DDS/Patrol on five major UNIX platforms, including HP 9000. Patrol is a visual object-oriented systems management tool that facilitates automatic monitoring and management of distributed applications, databases and computer systems.

Patrol provides a complete visual interface to entire corporate systems and gives system administrators the ability to build an automatic procedures to monitor and control machines, databases and applications.

Through stored expertise libraries called "knowledge modules," Patrol provides proactive monitoring and automatic notification and recovery actions. It proactively resolves application problems as they occur. By simply clicking on graphical icons, users can display several layers of system details and obtain a comprehensive picture of the current state of every machine.

Contact Patrol Software Inc., 100 Marine Pkwy., Ste. 465, Redwood Shores, CA 94065; (415) 508-2900.

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Minisoft Buys Reflection

MiniSoft Inc. is offering users of Reflection series software the opportunity to upgrade to MiniSoft 92 for $59.

MiniSoft 92 combines precise terminal emulation, serial and LAN connectivity, multiple sessions under Windows, FTP file transfer, VT 220 and 320 emulation, support of the Reflection command language and built-in networking protocols.

MiniSoft 92 comes bundled with its own TCP/IP stack, NS and Telnet virtual terminal protocols, allowing connections to HP host computers across a wide variety of industry standard LANs including Novell, LAN Manager, Banyan and Lantastic.

Contact MiniSoft Inc., 13617 State Highway 9, Snohomish, WA 98290-9000; (800) 682-0200.

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LeeTech Software Announces DB/ADVISOR

LeeTech Software Inc. announced DB/ADVISOR for Operations. This is a special version of LeeTech's utility toolset for manipulation and optimization of databases on HP computer platforms.

DB/Advisor for Operations includes the most common database utility functions required by computer operations on a routine basis.

DB/Advisor for Operations can automatically monitor database capacity and

READER INFORMATION

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BEAR COMPUTER SYSTEMS INC.
CIRCLE 476
MagicDisk includes Virtual Disk, Memory Disk and Disk Shadowing software products. ResQuet is a real-time, shadowing-across-the-network product, for disaster recovery and related applications.

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usage profiles. This provides critical information for operations personnel to allocate resources and schedule major maintenance runs without interfering with scheduled production. Special emphasis is placed on tools which forecast problems before they interrupt daily operations.

DB/Advisor for Operations is available for both TurboIMAGE/iX and ALLBASE/SQL. Contact LeeTech Software Inc., 20410 Town Center Ln., Ste. 220, Cupertino,CA 95014; (408) 253-1987.

Circle 382 on reader card

IEM Releases Lower-Cost Peripherals

IEM expanded its line of periperals for HP users, adding less expensive, low-end disk drives and tape drives.

Included in the new line of peripherals are disk drives in a range of capacities from 170 MB to 2 GB; DAT drives with and without data compression, 8mm tape drives with and without compression and QIC tape drives.

On-site service and next-day drive replacement service are avialable in the United States, Canada and the United Kingdom.

Contact IEM, 1629 Blue Spruce Dr., Fort Collins, CO 80524; (303) 221-3005.

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Artecon Markets SAIC's VUE

SAIC ported HP's Visual User Environment (HP VUE) desktop interface to the Sun SPARC and IBM RS/6000 workstations. Users now can have a consistent desktop interface.

SAIC VUE 3.0 is based on and includes the OSF Motif window manager and it provides the user access to workstation power without UNIX knowledge. New features include multicolor icons, a bitmap/pixmap editor and desktop capability for placing files, directories and executables directly on the root window. Artecon is the marketing agent for SAIC's VUE 3.0

Contact Artecon 2460 Impala Dr., Carlsbad, CA 92008-7236; (619) 931-5500.

Circle 380 on reader card

PhaseII Introduces ClockWise For DOS LANs

PhaseII Software Corp. announced the release of ClockWise 2.0 for DOS LANs. ClockWise can operate standalone on a DOS LAN, or as a client to a ClockWise system on UNIX utilizing PC/NFS, Novell Netware or similar networking software.

ClockWise starts with many features of personal information managers such as calendars, notes, ToDo lists and address book, but then extends them to a group of people. By allowing this information to be shared, ClockWise helps groups avoid scheduling conflicts, helps managers delegate and monitor projects and tasks, and maintains a complete record of company activities.

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ClockWise for DOS is available for DOS 3.3 and higher. Requirements include 640K RAM, a hard drive and a 286 or better architecture. ClockWise will operate under Windows as a DOS application.

The basic client-server package, including the software for connecting with a ClockWise system running on a UNIX host is priced at $295 for a five-client system.

Contact PhaseII Software Corp., 444 Washington St., Ste., 407, Woburn, MA 01801; (617) 937-0256.

Circle 385 on reader card

Information Builders Supports OpenWarehouse

Information Builders announced that its Enterprise Data Access (EDA)/SQL client-server software will be integrated with HP's OpenWarehouse.

EDA/SQL and HP users will be able to access "warehoused" data on HP 9000 Series 800 (HP-UX) servers as well as operational data located on legacy systems throughout an enterprise.

OpenWarehouse components of the HP Information Access, and the Enterprise Information Server, are enabled to EDA/SQL, providing access to warehoused and operational data. EDA/SQL provides transparent access to enterprise-wide heterogeneous data residing in more than 50 different databases and file structures on 35 platforms with connectivity to almost 100 third party front-end tools and applications.

HP's OpenWarehouse delivers a suite of integrated products that delivers, manages and accesses data on the HP 9000 Series 800 computers as well as operational data stored in legacy systems.

Contact Information Builders Inc., 1250 Broadway, New York, NY 10001-3782; (212) 736-4433.

Circle 383 on reader card

HP Bundles Softbench 3.2 With Message

HP announced SoftBench 3.2, a new version of its software-development environment. It adds several features, including the SoftBench Message Connector, a point-and-click, task-automation tool. In addition, SoftBench 3.2 will be available on the Solaric 2.1 operating system from SunSoft.

SoftBench Message Connector will be bundled with SoftBench 3.2 for Solaris 2.1, HP-UX and Sun 4.1x operating systems. It also is available with the SoftBench Framework.

Additional new SoftBench capabilities for Solaris 2.1 include the distributed Debugger Environment and embedded SQL support to access databases in C or C++.

DBAccess/1000 Extends Client/Server Capability

Comsci Data Systems Inc. announced DBAccess/1000, software that provides real time access to IMAGE/1000 databases from HP 9000 and PC platforms over both serial RS-232 and LAN communication links.

With DBAccess, application software running on non-HP 1000 clients can retrieve and update critical information using the familiar IMAGE/1000 application programming interface.

DBAccess includes complete HP 1000 Server administration software and an extensive set of library routines for DOS and HP-UX Client Systems.

DBAccess provides full read/write capability plus roll/back commit, automatic conversion of binary values and concurrent access to 20 databases. It is priced from $1,750.

Contact Comsci Data Systems, P.O. Box 500595, Atlanta, GA 31150-0595; (404) 552-9499.

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Wollongong Ships Pathway Access For OS/2

The Wollongong Group announced PathWay Access 2.1 for the OS/2 platform along with a new version of PathWay runtime and API Developer's Tool Kit.

PathWay Access is a suite of TCP/IP applications that enables OS/2 2.0-2.1 and DOS/windows PCs or Macintosh computers to access applications, printers and share resources with a wide range of computer systems throughout the network including UNIX, OpenVMS, MVS and VM.

Contact The Wollongong Group, 1129 San Antonio Rd., Palo Alto, CA 94303-4374; (800) 872-8649; (415) 962-7100.

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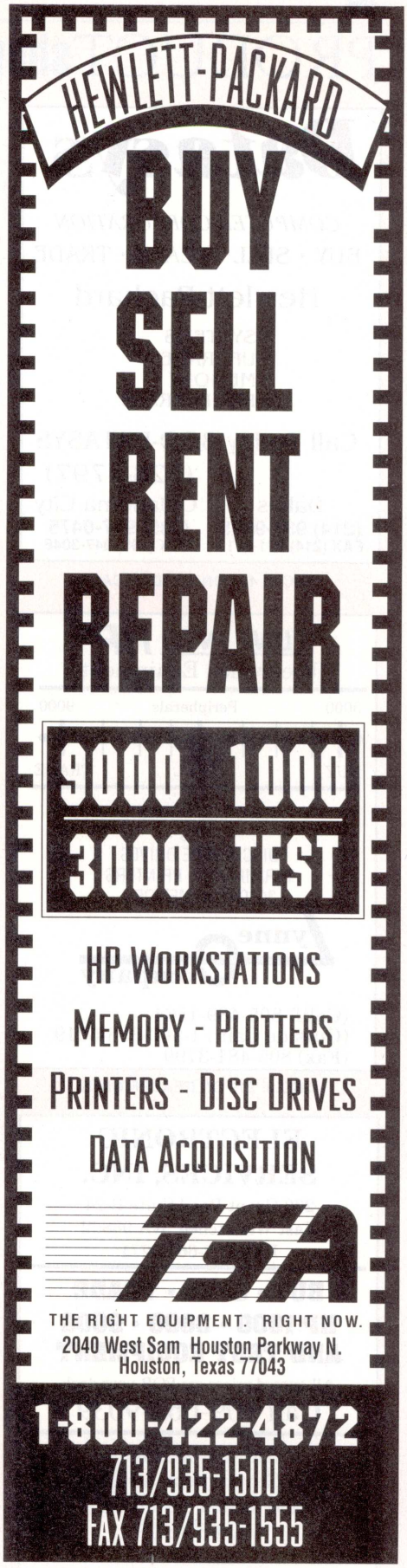

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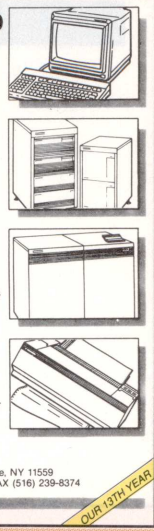

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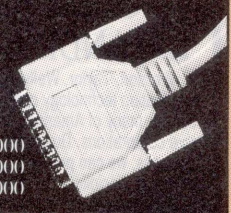

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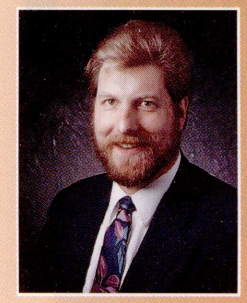


Gordon McLachlan

Not The Big One

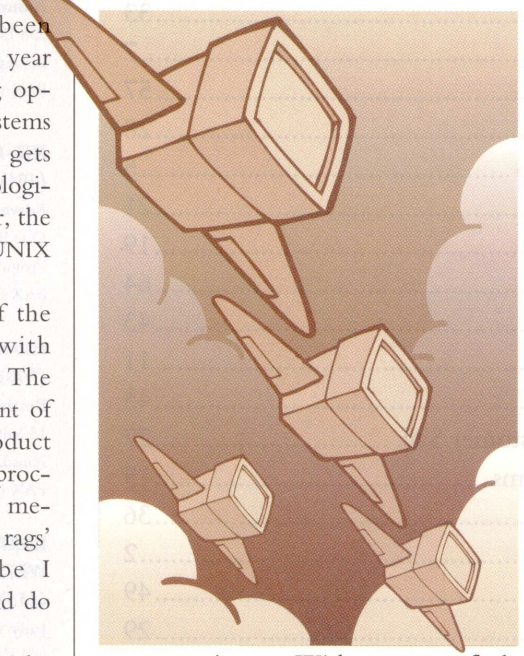
1993 has been cast as the year of the big operating systems war. It isn't really, but the press gets bored if it doesn't have some technological revolution in its sights. This year, the skirmish between NT, OS/2 and UNIX is being miscast as the Big One.

Part of the hype is because of the trade media's preoccupation with Microsoft and its CEO, Bill Gates. The company gets an inordinate amount of attention every time it pops a product press release or some new visionary proclamation from Chairman Bill. For media overkill, Bill Gates is the trade rags' equivalent of Madonna. Maybe I wouldn't mind so much if he could do a leather teddy some justice.

There's a large measure of wishful thinking involved, too. People want there to be a killer new operating system. It's pretty clear that today's operating systems don't cut it in that client-server wonderland we all think we're going to. It's nice to think that Gates and Company are going to bulldoze the landscape and build us our software Disneyland.

Microsoft's "Windows Everywhere" campaign aims to put Windows on every computer, TV set and coffee maker in the land. It'll be a nice piece of work if they pull it off, but if great proclamations of vision were all that it took, Steve Jobs and NeXT wouldn't be flopping around on the deck of the boat.

To me, NT looks like just another operating system. It certainly isn't blazing any new trails. Basically portable Windows on steroids, NT doesn't offer any groundbreaking networking or object technology and no fancy systems management gizmos. Without more flash, NT is not going to take over the world.



That isn't to say that NT is any sort of failure. Thirty-two-bit Windows with decent multitasking is exactly what Microsoft should be doing, and it is going to be a solid success for the company. It might be better than OS/2, or it might not. The only thing that is certain is that NT is not the operating system of the future. It might be good, but it's missing too many parts to fill that bill.

The operating systems of the future are going to be heavily loaded with object technology to make client-server systems easier to develop and manage. Multimedia, networking and the Windows GUI will be key components of those systems, and the systems will be hardware independent. In many ways, NT looks more like the future than the other contenders, but things will change.

Microsoft is already looking past NT toward "Cairo," its object-oriented operating system. Likewise, Apple and IBM (remember them?) are busily cranking out an object-oriented operating system under their Taligent joint venture.

This spring, HP joined Sun, IBM, Novell, SCO and UNIX System Laboratories to form the Common Open Software Environment (COSE). As part of its mission to crank out a unified UNIX, COSE has taken on the task of setting multimedia standards and rolling the Object Management Group's object standards into their UNIX implementations.

In May, the COSE crew — along with Borland, Corel and WordPerfect — also called for the Windows application program interfaces (API) to be pulled into the public domain, where they could be sat on and hatched by an industry brain trust.

While calling for the APIs to be public was a healthy admission from COSE members that Windows was going to kill them if they didn't do something about it, it would also be nice if Microsoft were to admit that it doesn't have the juice to single-handedly redefine the face of computing.

This Public Windows Interface might sound like a good idea, if it can keep up with Microsoft's API of the Week Club. However, if COSE wants cooperation from Microsoft, they should think about paying some royalties instead of trying to wrest its kill from it like a pack of hyenas. As hard as it is to deal with Microsoft while it feels omnipotent, COSE might get more respect as a customer than a competitor.

As Sparky Anderson, manager of the Detroit Tigers, put it so succinctly: "What was, was, and what is, is." To which I can only add the line from "Que Sera, Sera": "What will be, will be," and it ain't gonna be NT or any of the other current pretenders. ■

Illustration by Jack Rotoli

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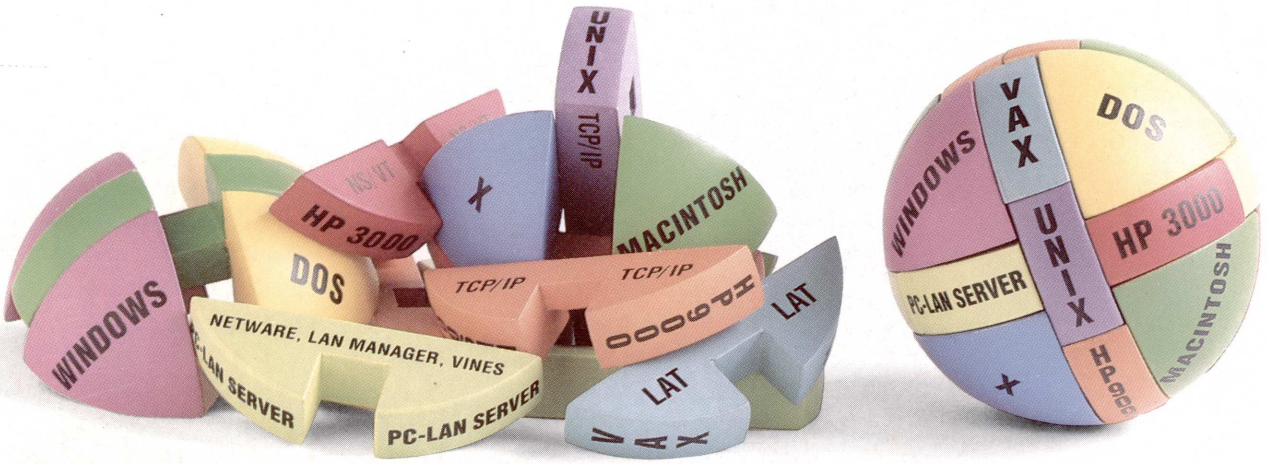

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